

# Evaluation and Findings Report:

## Clean Water Act Section 401 Water Quality Certification Hells Canyon Complex (FERC Project Number 1971)

May 2019



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# 1 Introduction

The Hells Canyon Complex (HCC) is located on the Snake River on the Oregon and Idaho border and consists of the Brownlee development, the Oxbow development, and the Hells Canyon development (Figure 1).

In July 2003, Idaho Power Company (IPC; Applicant; Company) filed an application with the Federal Energy Regulatory Commission for a new license authorizing the continued operation of the Hells Canyon Complex (HCC; Project), FERC Project No. 1971, pursuant to the Federal Power Act. The Oregon Department of Environmental Quality and the Idaho Department of Environmental Quality (collectively the DEQs) advised IPC that a water quality certification, pursuant to § 401 of the Clean Water Act, is required from each state in connection with the federal relicensing of the HCC. IPC seeks water quality certifications to support the license application filed with FERC.

This report provides an evaluation of IPC's § 401 certification application received by DEQ on June 14, 2018, as supplemented by documents submitted by IPC listed in section "Project Information and Summary of Project, 401 Application," below.

## 2 Requirements for Certification

### 2.1 Applicable Federal and State Law

Section 401 of the Federal Clean Water Act (Clean Water Act or CWA), 33 USC §1341, establishes requirements for State certification of proposed projects or activities that may result in any discharge of pollutants to navigable waters. Before a federal agency may issue a permit or license for any project that may result in any discharge of pollutants to navigable waters, the state must certify that the proposed project will comply with applicable provisions of Sections 301, 302, 303, 306, and 307 of the Clean Water Act and any state regulations, including state water quality standards, adopted to implement these sections. The state is further authorized to condition any granted certificate to assure compliance with state water quality standards and other appropriate requirements of state law.

DEQ is the agency of the State of Oregon designated to carry out the certification functions prescribed by section 401 of the Clean Water Act for state waters. DEQ must act on an application for certification in a manner consistent with the following federal and state requirements:

**Federal Requirements:** Sections 301, 302, 303, 306, and 307 of the Federal Clean Water Act. These sections prescribe, among others, effluent limitations; water quality related effluent limitations; water quality standards and implementation plans; national standards of performance for new sources; and toxic and pretreatment effluent standards.

**State Requirements:** Oregon Administrative Rules (OAR) 340-041 and 340-048-0005 to 340-048-0050: These rules were adopted by the Environmental Quality Commission to prescribe the state's water quality standards (OAR 340-041) and procedures for receiving, evaluating, and taking final action upon a section 401 certification application (OAR 340-048). The rules include requirements for general information such as the location and characteristics of the project, as well as confirmation that the project complies with other appropriate requirements of state law including provisions addressing ORS 197.180, which requires



certification decisions to comply with water-quality-related requirements in statewide planning goals and the provisions in acknowledged comprehensive plans and land use regulations that implement the goals.

OAR 340-039: This rule establishes the requirements for water quality trading in Oregon.

OAR 340-048-0037: These rules describe the Hydroelectric Application Review Team (HART) coordination process. The rules include a requirement for DEQ to provide 60 days for public comment on a proposed section 401 certification decision.

Environmental Quality Commission rules identify the information that must be included in an application for section 401 certification (OAR 340-048-0020(2)). The application together with information or comments provided during public comment and interagency coordination is essential to support the following determinations made by DEQ:

- The determination of whether to issue or deny certification.
- The determination of conditions that are appropriate to include in any granted certificate.
- Development of findings as required by ORS 468B.040 and ORS 197.180(1).

On-site disposal of sewage is governed by ORS 454.705 et. seq. and OAR Chapter 340, Divisions 71 and 73. The purpose of these rules is to prevent health hazards and protect the quality of surface water and groundwater. IPC indicates there are no plans for waste facilities at the Project location. The DEQ has permitted (OR 002727-8) a sewage holding tank for the Hells Canyon Project. As such, no treated or untreated sewage is disposed directly to surface waters of Oregon or Idaho.

ORS 466.605 et. seq. and ORS 468.780-815 establish requirements for reporting and cleanup of spills of petroleum products and hazardous materials. ORS 468.742 requires submittal of plans and specifications for water pollution control facilities to DEQ for review and approval prior to construction. One of the purposes of these statutes and rules is to prevent contamination of surface or groundwater.

ORS 196.810: This statute requires that permits be obtained from the Oregon Department of State Lands (DSL) prior to any fill and removal of material from the bed or banks of any stream. Such permits, if issued, contain conditions to assure protection of water quality to protect fish and aquatic habitat. The proposed new license will include construction activities which may require a removal-fill permit from DSL, a dredge and fill permit from the Corps pursuant to § 404 of the Clean Water Act, and a §401 water quality certification from DEQ. Idaho Power Company must first obtain all applicable permits, certificates, and authorizations prior to engaging in activities required under the terms of a new FERC License

ORS 468B.040: This statute prescribes procedural requirements and findings with which DEQ must comply as it makes a decision on a section 401 certification application. This statute references the federal law requirements, state water quality rules, and other requirements of state law regarding hydroelectric projects. DEQ may consider the following water-quality-related statutes to determine other appropriate requirements of state law consistent with section 401 of the Federal Water Pollution Control Act, P.L. 92-500, as amended.

ORS 496.012: This statute and its implementing rules establishes ODF&W's primary directive to prevent serious depletion of any indigenous species and require measures to maintain all species of fish and wildlife at optimum levels. OAR 635-415-0000 – 0030 (Fish and Wildlife Habitat Mitigation Policy).

ORS 496.435: This statute promotes rehabilitation of salmon and trout populations by restoration of native stocks to historic levels of abundance. OAR 635-007-0502 through 0509 sets forth the Native Fish

Conservation Policy. OAR 635-500-0100-0120 requires maintenance of the genetic diversity and integrity of wild trout stocks; and protection, restoration and enhancement of trout habitat.

ORS 509.585 – 509.645: This statute requires that owners or operators of all artificial obstructions in Oregon waters where migratory native fish are currently or have historically been present must provide for upstream and downstream passage for native migratory fish.

ORS 541.405: This statute sets forth the Oregon Plan for Salmon and Watersheds that provides for restoration of native fish populations, and the aquatic systems that support them, to productive and sustainable levels that will provide environmental, cultural and economic benefits.

ORS 543A: This statute establishes procedures for coordination among state agencies in the reauthorization of federally licensed hydroelectric projects, including state certification of water quality.

## **2.2 General Application of State Water Quality Standards**

Oregon water-quality standards were enacted under the authority of the Federal Clean Water Act, 33 U.S.C. 1251 – 1387, to implement the Act’s primary goal of “restor[ing] and maintain[ing] the chemical, physical, and biological integrity of the Nation’s waters.” 33 U.S.C. 1251(a). Oregon state law provides that the Environmental Quality Commission may perform all necessary acts to implement the Federal Clean Water Act, as amended and federal regulations or guidance issued pursuant to that act, including promulgation of rules. ORS 468B.035.

Oregon water quality standards are contained in Oregon Administrative Rule (OAR) Chapter 340, Division 41 entitled "Department of Environmental Quality Water Pollution Division 41 Water Quality Standards: Beneficial Uses, Policies, and Criteria for Oregon."

The water quality standards in Division 41 are composed of three elements: designated beneficial uses, numeric and narrative criteria, and the anti-degradation policy. The role of each of these is explained below.

### **2.2.1 Designated Beneficial Uses**

The Oregon water quality standards are designed to attain or maintain the level of water quality necessary to support designated beneficial uses. DEQ considers the designated uses of a body of water when reviewing whether a proposed activity will meet state water-quality standards. The regulatory approach is: (1) identify beneficial uses; (2) develop and adopt criteria for water quality parameters to protect the identified beneficial uses; (3) establish and enforce discharge limitations for each source that is permitted to discharge treated wastes into public waters to assure that water quality standards are not violated and beneficial uses are not impaired; and (4) establish and implement "best management practices" for a variety of "land management" activities to minimize their contribution to lower water quality standards and impairment of beneficial uses.

Designated beneficial uses exist for each river basin in Oregon. Some stream reaches have specific designated beneficial uses. The Project is located on the Snake River. Oregon’s designated beneficial uses for the Snake River are listed in OAR 340-041-0121, Table 121A and Table 121B. These uses include public domestic water supply, private domestic water supply, industrial water supply; irrigation; livestock watering; fish & aquatic life; wildlife & hunting; fishing; boating; water contact recreation; aesthetic

quality; hydropower; and commercial navigation and transportation. Fish use designations are shown in Figure 151A, and Figure 260A and salmon and steelhead spawning use designations are shown in Figure 151B.

## **2.2.2 Narrative and Numeric Criteria**

Criteria can be expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular designated beneficial use. When criteria are met, water quality will generally protect the designated beneficial use. Development of water quality standards is a continuing process. As new information becomes available, criteria for additional parameters may be added and existing numeric and narrative criteria may be revised. As individual projects are evaluated for compliance with state water-quality standards, narrative criteria may be translated into specific limitations to ensure proposed activities are consistent with the specific beneficial uses and attributes of a particular body of water.

## **2.2.3 Anti-degradation Policy**

Oregon's anti-degradation policy (OAR 340-041-0004) guides decisions that affect water quality such that unnecessary further degradation from new or increased point and nonpoint sources of pollution is prevented, and decisions are made to protect, maintain, and enhance existing surface water quality to ensure the full protection of all existing beneficial uses. Accordingly, this policy supplements other applicable criteria.

## **2.2.4 Total Maximum Daily Loads**

DEQ also develops, and the U.S. Environmental Protection Agency approves, lists of waters that are water quality limited pursuant to CWA § 303(d). A Total Maximum Daily Load identifies the amount of a specific pollutant that a listed water body can receive and still meet water quality standards and support the beneficial uses designated in that waterbody. A TMDL also identifies wasteload allocations for point sources of pollutants and load allocations for non-point sources. For a hydroelectric project located on a water quality-limited waterbody, a section 401 certification may serve as the means for implementing load allocations assigned to the project. Rules for developing, issuing and implementing TMDLs are in OAR 340-042-0025 through 340-042-0080.

# **3 Project Information and Summary of Project**

## **3.1 Applicant Information**

### **3.1.1 Name and Address of Project Owner (Applicant)**

Idaho Power Company  
1221 West Idaho Street  
P.O. Box 70  
Boise, ID 83702  
Phone: (208) 388-2676

### 3.1.2 Name and Address of Owner's Official Representative

James C. Tucker  
Lead Counsel  
Idaho Power Company  
1221 West Idaho Street  
P.O. Box 70  
Boise, ID 83702

### 3.1.3 § 401 Application (Original Application and Supplements)

The following documents were submitted by the Applicant as supplements to the § 401 application received on June 14, 2018, and form the basis of DEQ's evaluation of the Project's compliance with state water quality standards and other appropriate requirements of state law as described herein.

- Stipulation and Implementation Agreement for the Hells Canyon Complex Hydroelectric Project, dated April 22, 2019.
- Juvenile Fall Chinook Salmon Entrapment Management Plan for the Upper Hells Canyon Reach of the Snake River. Idaho Power Company. October 2018. Received via email from Jim Chandler, 10/30/2018.
- Summer Entrapment Pool Survey Plan. Idaho Power Company. October 2018. Received via email from Jim Chandler, 10/30/2018.
- Memo re: Response to additional information questions relative to IPC's June 2018 Section 401 Water Quality Certification Application, Dated October 25, 2018, received via email from IPC, 10/25/2018.
- *New license application: Hells Canyon Hydroelectric Project*. 6-CD set submitted to FERC. July 2003.  
<https://www.idahopower.com/AboutUs/RatesRegulatory/Relicensing/hellscanyon/HCapp.cfm>

Additional reports or documents used in DEQ's §401 Evaluation of this Application, as supplemented, are identified in the References section.

## 3.2 Project Description and Operations

The Hells Canyon Complex Hydroelectric Project is located on the Snake River in the southern part of the Hells Canyon along the border between Oregon and Idaho. The Project includes Brownlee, Oxbow, and Hells Canyon dams, reservoirs, and powerhouses that lie within Malheur, Baker, and Wallowa counties in Oregon and Adams and Washington counties in Idaho. The Hells Canyon Complex includes the Snake River from Farewell Bend, Oregon, downstream approximately 95 river miles to the Hells Canyon Dam.

A more detailed description of the Project is included in Exhibit A of the *New License Application: Hells Canyon Hydroelectric Complex*. 6-CD set submitted to FERC. July 2003.  
<https://www.idahopower.com/AboutUs/RatesRegulatory/Relicensing/hellscanyon/HCapp.cfm>

### 3.2.1 Waters of the State Potentially Impacted by Project

The FERC project boundary for the Hells Canyon Complex extends from above Porter Island at river mile 343, to Hells Canyon dam at river mile 247.6. Altogether, the HCC Project occupies about 95 river miles of the Snake River.

According to the final license application “The Hells Canyon Complex comprises five distinct reaches: Brownlee Reservoir (RM 343.0 to 284.6), Oxbow Reservoir (RM 284.6 to 272.5), the bypassed reach below Oxbow Dam (RM 272.5 to 270.0), Hells Canyon Reservoir (RM 270.0 to 247.6), and the Snake River below Hells Canyon Dam (RM 247.6 to 168.4) (Figure E.2-1). In addition, Brownlee Reservoir exhibits three longitudinal zones. The first of these zones is the riverine zone, located farthest upstream. This zone is highly influenced by inflow from the Snake River. Another zone is the lacustrine zone, located farthest downstream. This zone exhibits properties most characteristic of a lake, including thermal stratification. The last zone, the transition zone, is located between the lacustrine and riverine zones (Idaho Power Company, 2003) (page E.2-5)”. Figure 1 identifies the three dams and reservoirs that comprise the Hells Canyon Complex.

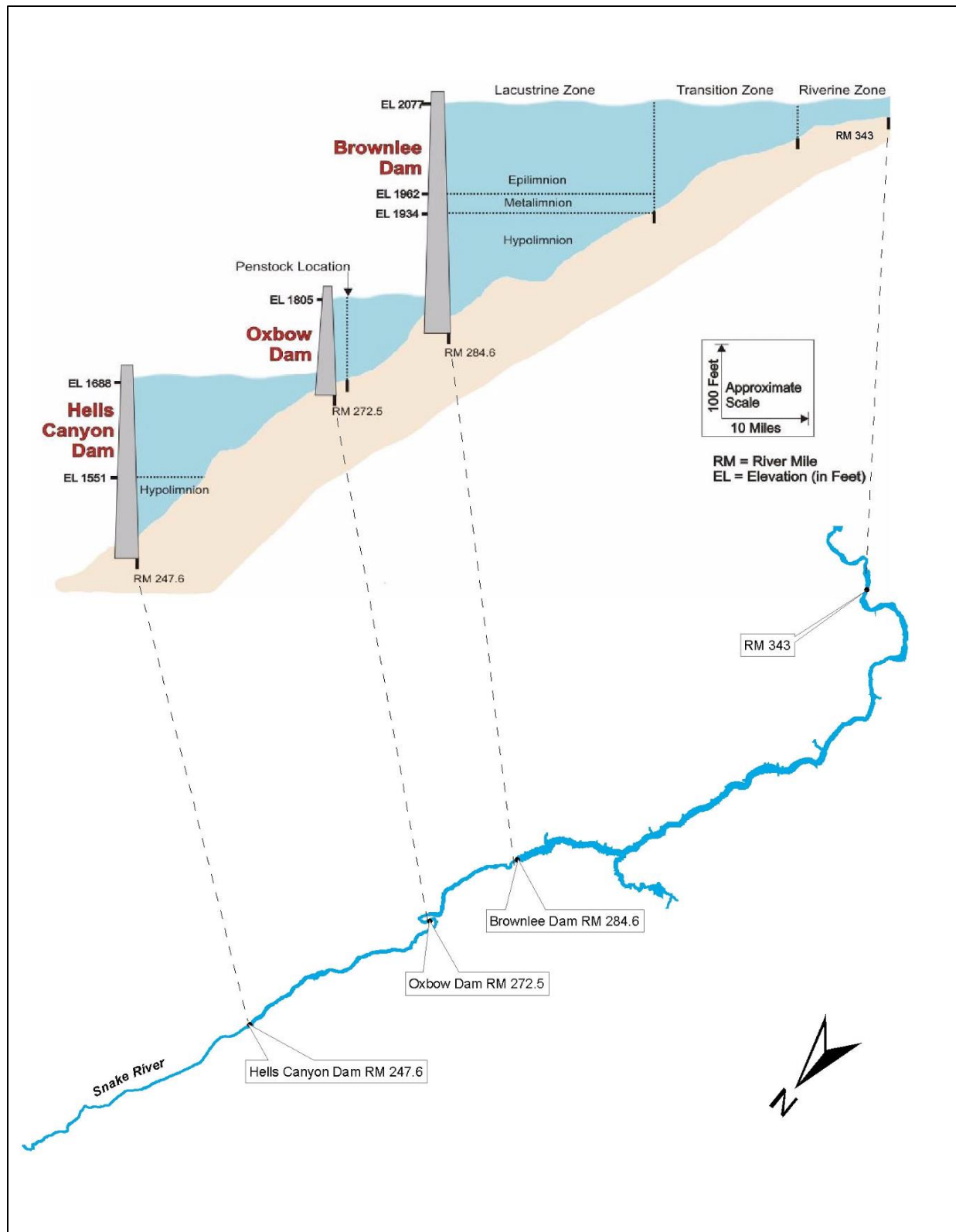


Figure 1: Hells Canyon Complex river miles

### 3.2.2 Adjacent Land Use and Ownership

The Project area includes 17,070 acres of land, including lands both above and below the normal high-water mark. This acreage includes 5,600 acres (33%) of federal land; 340 acres (2%) of state land; and 11,130 acres (65%) of private land. Of the privately owned land in the project area, IPC owns 9,660 acres (57% of the total acreage) (Idaho Power Company, 2018).

Of the total project acreage, 6,850 acres (40%) are above the normal high-water mark. Federal and state lands comprise 1,930 acres (28%) and 230 acres (3%), respectively, of the total non-flooded acreage. Private lands make up 4,690 acres, or 68% of the non-flooded lands in the project area. Of these lands, IPC owns 3,450 acres, or half of all the non-flooded lands in the project area (pg.16) (Idaho Power Company, 2018).

Land in the Hells Canyon Complex area has six primary uses: cultivated agriculture, livestock grazing, hydroelectric power generation, recreation, wildlife habitat, and residential and rural residential use. The canyon's geography determines the distribution of these land uses and the aesthetic character of the area. More detail on land use throughout the Hells Canyon Complex is available in the *New License Application: Hells Canyon Hydroelectric Complex*, Exhibit E.6. July 2003.

### 3.2.3 Hells Canyon Complex Project Facilities

The three project reservoirs were constructed primarily for power production, although Brownlee Reservoir has operational requirements related to flood control. Construction of the Hells Canyon Complex began in 1958 with the construction of Brownlee Dam, followed by Oxbow Dam facilities in 1961 and Hells Canyon Dam in 1967.

The three dams have a total nameplate generating capacity of 1,166.4 megawatts, or enough electric energy to supply about 750,000 homes. Brownlee powerhouse contains four, 90.1-megawatt (MW) generators and one, 225-megawatts (MW) generator with a combined nameplate capacity of 585.4 MW. Oxbow's four generating units have a total nameplate capacity of 190 megawatts (MW). The Hells Canyon powerhouse has three generating units with a total nameplate capacity of 391 megawatts (MW).

The combined water volume of the three Hells Canyon Complex reservoirs is about 1,647,500 acre-feet, while the usable storage is 1,009,198 acre-feet. Brownlee Reservoir is 57 miles long and is the largest of the three reservoirs, with a total volume of about 1,420,000 acre-feet and a usable storage of 975,318 acre-feet. Average annual flow into Brownlee Reservoir is about 13,000,000 acre-feet. Despite the large volume of Brownlee Reservoir, retention times are relatively low (about 30 days) because of the large amount of flow into the reservoir. Oxbow Reservoir is 12 miles long and has a total volume of 58,385-acre-feet and a maximum useable storage of 10,857 acre-feet. Hells Canyon Reservoir measures 25 miles in length, 167,720 acre-feet in full-pool volume, and has a maximum useable storage of 23,060 acre-feet (Idaho Power Company, 2018).

The three reservoirs are relatively deep, with average depths ranging from 50 feet (Oxbow Reservoir) to 100 feet (Brownlee Reservoir). Maximum depth in Brownlee Reservoir is 300 feet. Both Oxbow and Hells Canyon reservoirs have normal water level fluctuations of about five feet with an additional five feet for atypical circumstances. In contrast, the water level fluctuation of Brownlee Reservoir is about 100 ft. Most of the water level fluctuation in Oxbow and Hells Canyon reservoirs relates to power production, while flood control accounts for most of the annual change in water surface elevation in Brownlee Reservoir.

The *New License Application: Hells Canyon Hydroelectric Complex*, Exhibit A July 2003 contains a more detailed description of Project facilities.

### **3.2.4 Current Operations**

IPC operates the Hells Canyon Complex to comply with its existing FERC license and with voluntary arrangements to accommodate other interests such as recreational use and environmental resources. As noted by IPC, “Among these arrangements are the Fall Chinook Interim Recovery Plan and Study (IPC 1991), voluntarily adopted by IPC in 1991 to protect the spawning and incubation of Snake River fall Chinook (SRFC) salmon below HCD, which are listed as a threatened species under the Endangered Species Act of 1973 (ESA), and, most recently, the Hells Canyon Hydroelectric Project Settlement Process Interim Agreement (2005 Interim Agreement) that IPC entered into with multiple parties relating to the operation of the HCC pending the issuance of a new license. While portions of the 2005 Interim Agreement have expired, other portions remain in effect pending the issuance of a new license for the HCC” (Idaho Power Company, 2018).

#### **Brownlee Reservoir Operations**

Of the three Hells Canyon Complex reservoirs, Brownlee Reservoir is the only reservoir with significant storage. It has 101 vertical feet of active storage capacity, which equals approximately 1 million acre-feet of water. Brownlee Reservoir’s powerhouse capacity is approximately 35,000 cubic feet per second (cfs).

While Brownlee Reservoir’s primary purpose is providing a stable power source, the reservoir is used to control flooding, in cooperation with the U.S. Army Corps of Engineers North Pacific Division. After meeting flood-control requirements in early summer, the reservoir refills to meet peak summer electricity demands and to provide habitat for spawning bass and crappie. The full reservoir also offers optimal recreational opportunities through the Fourth of July holiday (Idaho Power Company, 2018).

As part of the 2005 Interim Agreement, IPC agreed to provide up to 237,000 acre-feet of water from Brownlee Reservoir in June and July 2005 and 2006. Although the portion of the 2005 Interim Agreement relating to annual flow augmentation releases has expired, in cooperation with the National Oceanic and Atmospheric Administration (NOAA) Fisheries, IPC has continued to provide these flow augmentation releases annually through 2018. FERC staff included a recommendation for the continuance of these flow augmentation releases from the HCC in the FEIS issued in August 2007 (Federal Energy Regulatory Commission, 2007). IPC expects to continue discussions with the federal resource agencies with regard to annual flow augmentation releases pending the relicensing of the HCC.

IPC manages its late fall release from Brownlee Reservoir to maintain operationally constant flows below Hells Canyon Dam for Snake River Fall Chinook spawning. Following the period of operationally constant flow, a minimum flow below Hells Canyon Dam ensures sufficient water levels to protect spawning redds. In early December, IPC biologists determine the flow required to protect the most critical shallow redd. This flow becomes the minimum Hells Canyon Dam outflow during the Snake River Fall Chinook salmon incubation and rearing period.

#### **Oxbow and Hells Canyon Reservoir Operations**

When flows through the HCC are below hydraulic capacity, all three projects operate closely together to reregulate flows through the Oxbow and Hells Canyon projects to meet a one-foot-per-hour ramp rate requirement (measured at Johnson Bar below Hells Canyon Dam) and to meet the daily peak load demands. However, when flows exceed powerhouse capacity for any of the projects, IPC releases water over the spillways at those projects.



IPC also maintains minimum flow rates in the Snake River downstream of Hells Canyon Dam as specified under Article 43 of the existing license. Neither the Brownlee Project nor the Oxbow Project has minimum flow requirements below its powerhouses. However, because of the Oxbow Project’s unique configuration, IPC maintains a flow of 100 cubic feet per second in the bypassed reach of the Snake River below the dam (an Oxbow-shaped reach called the Oxbow Bypass) (Idaho Power Company, 2018)(Pg. 23).

### 3.2.5 Proposed Operations

IPC describes the Hells Canyon Complex proposed operations in detail in Table 4.5-1 of the June 14, 2018 application for Section 401 water quality certification (Idaho Power Company, 2018)(Pg. 18-20), and proposed activities as described detail in Section E.3.1.3.1.2 of the *New License Application: Hells Canyon Hydroelectric Complex*. The June 14, 2018 application for Section 401 certification was modified to reflect inclusion of agreed-to activities set forth in a settlement agreement, which is available at <https://www.oregon.gov/deq/wq/wqpermits/Pages/Section-401-Hydropower.aspx>.

Accordingly, the Section 401 water quality certification is based upon DEQ's evaluation of IPC's proposed activities in that application and in the settlement.

## 4 Beneficial Uses and Water Quality Status of the Snake River

### 4.1 Beneficial Uses in the Snake River

The designated beneficial uses for the Snake River and its tributaries are outlined in Oregon Administrative Rules 340-041. Specifically, the designated beneficial uses for the Snake River are described in Table 121A, Table 121B, and extent and timing of the fish use designations for the Snake River and its tributaries are described in Figure 260A, Figure 151A and Figure 151B. Oregon Administrative rules require management of water quality to protect designated beneficial uses.

Table 1, below, summarizes the designated beneficial uses from Table 121A (OAR 340-041-0120).

**Table 1: Designated Beneficial Uses - Snake River**

Beneficial Uses	Snake River RM 176 to 409
Public Domestic Water Supply	X
Private Domestic Water Supply	X
Industrial Water Supply	X
Irrigation	X
Livestock Watering	X
Fish & Aquatic Life <sup>1</sup>	X
Wildlife & Hunting	X
Fishing	X
Boating	X
Water Contact Recreation	X

<sup>1</sup> See also Table 2 for fish use designations for this river.

Beneficial Uses	Snake River RM 176 to 409
Aesthetic Quality	X
Hydro Power	X
Commercial Navigation & Transportation	X

Fish use designations are described in Table 121B (OAR 340-041-0121) and mapped in Figures 151 A, 151B and 260A and are summarized in Table 2 below.

**Table 2: Snake River Fish Use Designation**

Geographic Extent of Use	Salmon and Steelhead Migration Corridors (20°C)	Redband or Lahontan Cutthroat Trout (20°C)	Salmon and Steelhead Spawning through Fry Emergence
Hells Canyon Dam to confluence with Salmon River	X		October 23- April 15
Confluence with Salmon River to Oregon/Washington Border	X		November 1- May 15
Hells Canyon Dam to Idaho border (RM 247.5 to RM 409)		X	

As noted in Table 2, the beneficial fish uses from Hells Canyon dam to the Idaho border include Redband or Lahontan Cutthroat trout. Figure 2, “Figure 260A: Fish Use Designations, Powder Basin Oregon” from OAR 340-041-0260 shows the extent of this designation on a map.

The Snake River from Hells Canyon dam to the Oregon/Washington border is designated for Salmon and Steelhead Migration Corridors and Salmon and Steelhead Spawning through Fry Emergence. The extent of these designations is shown on Figure 3 (Figure 151A: Fish Use Designations Grande Ronde Basin, Oregon from OAR 340-041-0151) and Figure 4 (Figure 151B: Salmon and Steelhead Spawning Use Designation Grande Ronde Basin, Oregon from OAR 340-041-0151) below. As noted in Figure 4, salmon and steelhead spawning through fry emergence applies from October 23 through April 15 from below Hells Canyon dam to the confluence with the Salmon River. The same designated use applies from November 1 through May 15 from the confluence with the Salmon River to the Oregon/Washington Border.

## 4.2 Native and Extirpated Fish Species

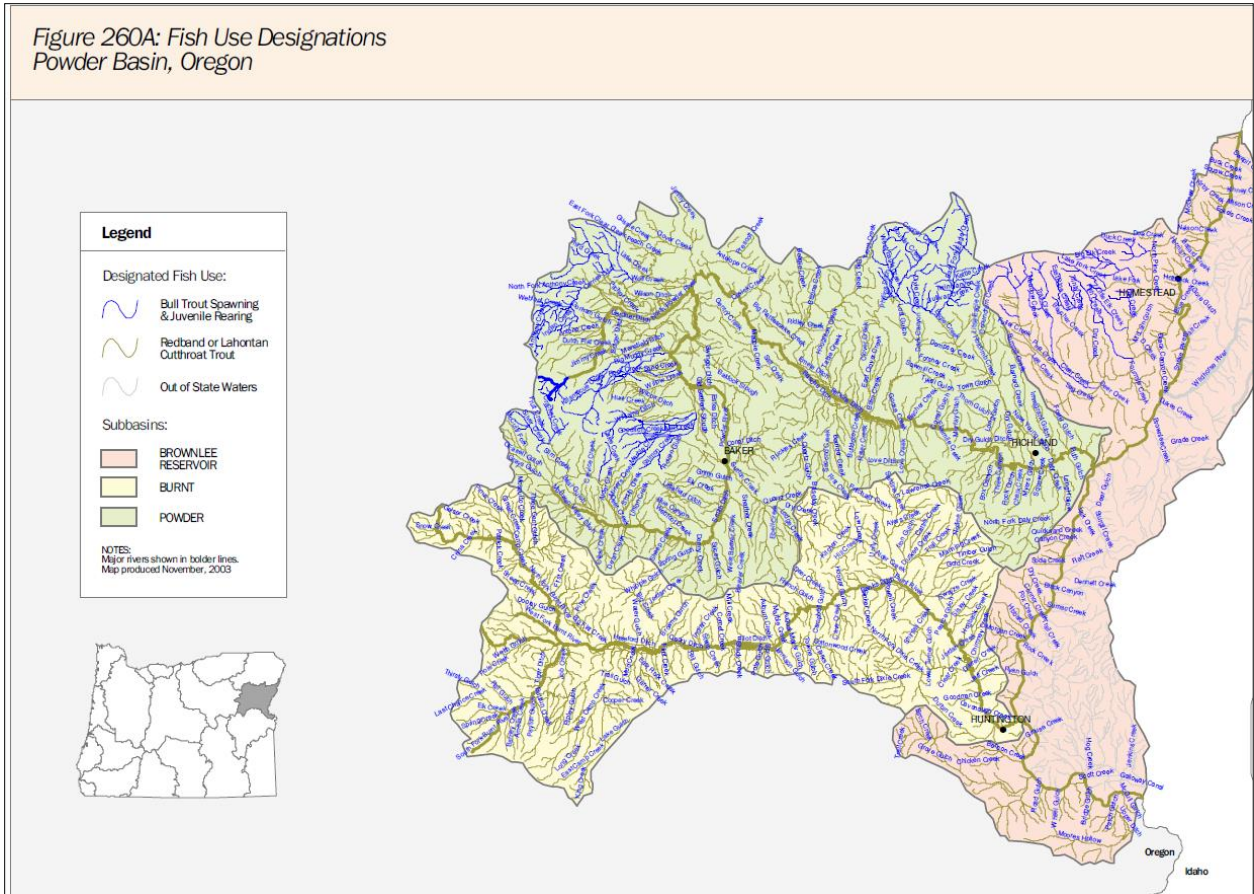
**Table 3** lists native fish currently known to occur in the Powder Basin (Figure 2). Fishery resources have changed dramatically in the Powder Basin in the last 50-100 years. Four species of salmonids have been extirpated from the basin (**Table 4**). Anadromous fish were eliminated from the Snake River and its tributaries including the Powder Basin, after the construction of Brownlee, Oxbow, and Hells Canyon Dams on the Snake River in the late 1950s and 1960s.

**Table 3: Native fish currently known to occur in Powder Basin (Nowak, 2004)**

<b>Common Name</b>	<b>Scientific Name</b>
Redband trout	<i>(Oncorhynchus mykiss gibbsi)</i>
White sturgeon	<i>(Acipenser transmontanus)</i>
Mountain whitefish	<i>(Prosopium williamsoni)</i>
Bull trout	<i>(Salvelinus confluentus)</i>
Mottled sculpin	<i>(Cottus bairdi)</i>
Slimy sculpin	<i>(Cottus cognatus)</i>
Torrent sculpin	<i>(Cottus rhotheus)</i>
Shorthead sculpin	<i>(Cottus confuses)</i>
Piaiute sculpin	<i>(Cottus beldingi)</i>
Northern pikeminnow	<i>(Ptychocheilus oregonensis)</i>
Chiselmouth	<i>(Acrocheilus alutaceus)</i>
Peamouth	<i>(Mylocheilus caurinus)</i>
Longnose dace	<i>(Rhinichthys cataractae dulcis)</i>
Speckled dace	<i>(Rhinichthys osculus)</i>
Redside shiner	<i>(Richardsonius balteatus balteatus)</i>
Largescale sucker	<i>(Catostomus macrocheilus)</i>
Mountain sucker	<i>(Catostomus platyrhynchus)</i>
Bridgelip sucker	<i>(Catostomus columbianus)</i>

**Table 4: Fish Species Extirpated from the Powder Basin (Nowak, 2004)**

<b>Common Name</b>	<b>Scientific Name</b>
Coho salmon	<i>Oncorhynchus kisutch</i>
Sockeye salmon	<i>Oncorhynchus nerka</i>
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>
Steelhead	<i>Oncorhynchus mykiss</i>



**Figure 2: Powder Basin Fish Uses**

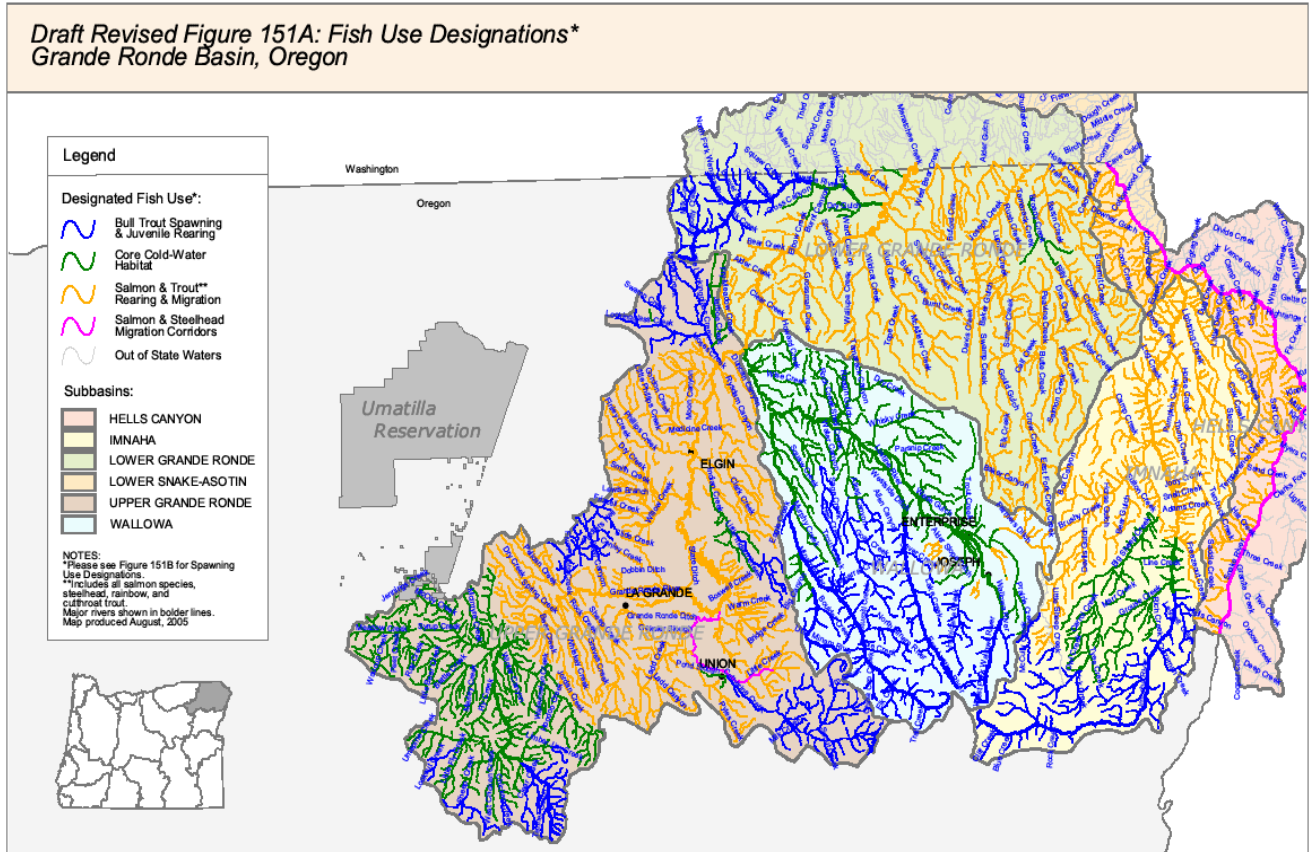
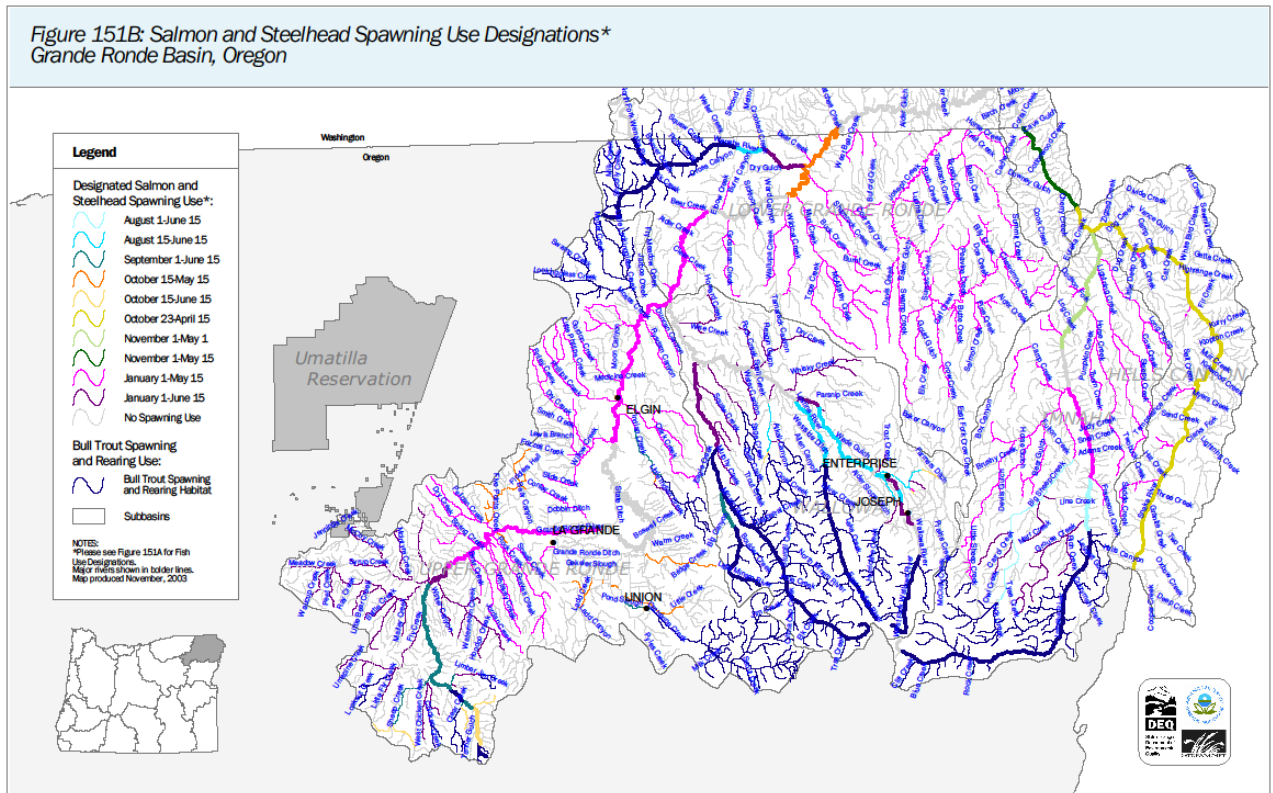


Figure 3: Grande Ronde Basin fish uses



**Figure 4: Grande Ronde Basin Salmonid and Steelhead Spawning**

## 5 Threatened and Endangered Aquatic Species in the Snake River

Aquatic species included on federal lists of endangered or threatened species, and occur in or migrate through the Snake River, are described below. The summary is included to highlight the sensitive nature of the aquatic resources in the Snake River.

### **Bull Trout**

The U.S. Fish and Wildlife Service (USFWS) issued a final rule listing all bull trout (*Salvelinus confluentus*) in the coterminous U.S. as threatened under the ESA on November 1, 1999. USFWS published a Final Recovery Plan on September 28, 2015.

### **Bliss Rapids Snail**

Bliss Rapids snail (*Taylorconcha serpenticola*) occurs in the Snake River. While this species does not occur in the action area addressed in the draft certifications, it does occur in spring water supplying an HCC mitigation hatchery above CJ Strike Dam, and so it is included in the overall ESA consultation for the HCC.

### **Snake River physa**

Snake River physa (*Physa (Haitia) natricina*) was listed as endangered effective January 13, 1993, with a recovery plan published in 1995. At the time of listing, the species was thought to occur in two populations in the Snake River upstream of C.J. Strike Reservoir. A 2009 review of invertebrate material collected in the Snake River by Idaho Power Company, confirmed with genetic analysis, shows the species occurs in Idaho Power Company's Snake River Stewardship Program action area, which extends from C.J. Strike Dam downstream to Brownlee Reservoir.

### **Salmon and Steelhead**

The Endangered Species Act defines species to include subspecies and distinct population segments of vertebrate species. A species may be listed as threatened or endangered. Under the ESA, National Marine Fisheries Service reviews the listing classification of threatened and endangered species at least once every five years. Following this review, NMFS must determine if any species should be: (1) removed from the list; (2) have its status changed from threatened to endangered; or (3) have its status changed from endangered to threatened. The most recent listing determinations for most salmon and steelhead occurred in 2005 and 2006. In 2016, NMFS completed a 5-year review of the ESA-listed salmonid species in the Snake River basin. These include Snake River Sockeye Salmon, Snake River spring/summer Chinook salmon, Snake River fall-run Chinook salmon, and Snake River steelhead. The status of each species is summarized in Table 5:<sup>2</sup>

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<sup>2</sup> Adapted from Table 1 of 2016 5-Year Review: Summary & Evaluation of Snake River Sockeye, Snake River Spring-Summer Chinook, Snake River Fall-Run Chinook, Snake River Basin Steelhead, National Marine Fisheries Service West Coast Region, Portland, OR. Downloaded from: [http://www.westcoast.fisheries.noaa.gov/publications/status\\_reviews/salmon\\_steelhead/2016\\_status\\_review.html](http://www.westcoast.fisheries.noaa.gov/publications/status_reviews/salmon_steelhead/2016_status_review.html). Download date: 11/9/2017.



**Table 5: Salmonid Status - Snake River**

<b>Salmonid Species</b>	<b>Original Listing</b>	<b>Revised Listing(s)</b>
Sockeye Salmon ( <i>O. nerka</i> ) Snake River Sockeye Salmon	FR Notice: 56 FR 58619 Date: 11/20/1991 Classification: Endangered	FR Notice: 70 FR 37160 Date: 6/28/2005 Classification: Endangered
Chinook Salmon ( <i>O. tshawytscha</i> ) Snake River Spring/ Summer-Run Chinook salmon	FR Notice: 57 FR 14653 Date: 4/22/1992 Classification: Threatened	FR Notice: 70 FR 37160 Date: 6/28/2005 Classification: Threatened
Chinook Salmon ( <i>O. tshawytscha</i> ) Snake River Fall-Run Chinook Salmon	FR Notice: 57 FR 14653 Date: 4/22/1992 Classification: Threatened	FR Notice: 70 FR 37160 Date: 6/28/2005 Classification: Threatened
Steelhead ( <i>O. mykiss</i> ) Snake River Basin Steelhead	FR Notice: 62 FR 43937 Date: 8/18/1997 Classification: Threatened	FR Notice: 71 FR 834 Date: 1/5/2006 Classification: Threatened

The ESA requires NMFS to develop and implement recovery plans for salmon and steelhead species listed under the Act. Recovery plans serve as a resource to organize on-the-ground actions based on the biological needs of the species. As noted by NMFS “The Snake River Salmon Recovery Sub-domain is one of three sub-domains comprising the Interior Columbia River Salmon Recovery Domain. It includes the Snake River from its confluence with the Columbia River upstream to Hells Canyon Dam, including watersheds such as the Salmon River and Clearwater River in Idaho, the Grande Ronde River in Oregon, and the Tucannon River in Washington. There are four listed salmon and steelhead species in this sub-domain: Snake River sockeye, Snake River spring/summer Chinook, Snake River fall Chinook, and Snake River steelhead.”<sup>3</sup> NMFS released the “ESA Recovery Plan for Snake River Fall Chinook Salmon (*Oncorhynchus tshawytscha*)” in November 2017. In November 2017, NMFS also released the “ESA Recovery Plan for Snake River Spring/Summer Chinook Salmon (*Oncorhynchus tshawytscha*) and Snake River Basin Steelhead (*Oncorhynchus mykiss*).”

## 6 Water Quality Impairment in the Snake River

Every two years, DEQ is required to assess water quality and report to the U.S. Environmental Protection Agency on the condition of Oregon's waters. DEQ prepares an Integrated Report that meets the requirements of the federal Clean Water Act for Sections 305(b) and 303(d). CWA Section 305(b) requires a report on the overall condition of Oregon's waters. CWA Section 303(d) requires identifying waters that do not meet water quality standards and where a Total Maximum Daily Load pollutant load limit needs to be developed. EPA issued final approval of Oregon's 2012 Integrated Report and 303(d) list in December 2018. EPA added 285 water bodies to the list, removed 56 water bodies from the list, and reclassified 714 stream segments affected by ongoing litigation over temperature water quality standards.

The following tables summarize the 2012 CWA Section 303(d) listings for the Snake River in the Project vicinity. All parameters except Mercury were addressed with the submission and approval of the 2003 Snake River Hells Canyon TMDL.

<sup>3</sup> Downloaded from: [http://www.westcoast.fisheries.noaa.gov/protected\\_species/salmon\\_steelhead/recovery\\_planning\\_and\\_implementation/snake\\_river/snake\\_river\\_salmon\\_recovery\\_subdomain.html](http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/snake_river/snake_river_salmon_recovery_subdomain.html). Downloaded on 11/9/2017



**Table 6: Integrated Report Status - chlorophyll a**

River Miles	Season	Status	Designated Use	Value
268.8 to 404	Summer	Water quality limited, TMDL approved		0.015 mg/l
280.5 to 404	Fall/Winter/Spring	Water quality limited, 303(d) list, TMDL needed		0.015 mg/l

**Table 7: Integrated Report Status – Toxics**

River Miles	Season	Status	Designated Use	Criteria
DDD 4,4				
268.8 to 404	Year Round	Water quality limited, TMDL approved	Human health	Table 40 Human Health Criteria for Toxic Pollutants
DDE 4,4				
268.8 to 404	Year Round	Water quality limited, TMDL approved	Human health	Table 40 Human Health Criteria for Toxic Pollutants
DDT 4,4				
268.8 to 404	Year Round	Water quality limited, TMDL approved	Human health; Aquatic life	Table 40 Human Health Criteria for Toxic Pollutants
Dieldrin				
268.8 to 404	Year Round	Water quality limited, TMDL approved	Human health; Aquatic life	Table 40 Human Health Criteria for Toxic Pollutants
Mercury				
173 to 244.2	Year Round	Water quality limited, 303(d) list, TMDL needed	Resident fish and aquatic life; Drinking water	Data from 1969 to present, average level of mercury found in fish tissue is 0.41 parts per million.
244.2 to 268.8	Year Round	Water quality limited, 303(d) list, TMDL needed	Resident fish and aquatic life; Drinking water	Data from 1969 to present, average level of mercury found in fish tissue is 0.41 parts per million.
268.8 to 281.1	Year Round	Water quality limited, 303(d) list, TMDL needed	Resident fish and aquatic life; Drinking water	Data from 1969 to present, average level of mercury found in fish tissue is 0.41 parts per million.
281.1 to 404	Year Round	Water quality limited, 303(d) list, TMDL needed	human health, fishing	Oregon Health Authority Advisory issued 2/28/12. The average level of mercury found in warm water fish from Brownlee Reservoir (RM 281.1-347.4) is 0.35mg/kg.

**Table 8: Integrated Report Status - Temperature**

River Miles	Season	Status	Designated Use	Criterion
185 to 244.2	Summer	Water quality limited, TMDL approved	Rearing	17.8 C
244.2 to 268.8	Summer	Water quality limited, TMDL approved	Rearing	17.8 C
268.8 to 281.1	Summer	Water quality limited, TMDL approved	Rearing	17.8 C
281.1 to 404	Summer	Water quality limited, TMDL approved	Rearing	17.8 C

**Table 9: Integrated Report Status - Dissolved Oxygen**

River Miles	Season	Status	Designated Use	Criterion
244.2 to 404	Year Round	Water quality limited, TMDL approved	Cool-water aquatic life	Not less than 6.5 mg/l

**Table 10: Integrated Report Status - Phosphorus**

River Miles	Season	Status	Designated Use	Criterion
268.8 to 404	Year Round	Water quality limited, TMDL approved	Aesthetics; Fish and aquatic life; Fishing; Water contact recreation; Water supply	Biocriteria: Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

**Table 11: Integrated Report Status - Sedimentation**

River Miles	Season	Status	Designated Use	Criterion
268.8 to 404	Year Round	Water quality limited, TMDL approved	Salmonid fish rearing; Resident fish and aquatic life; Salmonid fish spawning	The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry may not be allowed.

**Table 12: Integrated Report Status - Total Dissolved Gas**

River Miles	Season	Status	Designated Use	Criterion
185 to 281.1	Year Round	Water quality limited, TMDL approved	Fish and aquatic life	Not exceed 110% of saturation

## **6.1 Total Maximum Daily Load for the Snake River**

In July 2003, Oregon DEQ and Idaho DEQ submitted the Snake River - Hells Canyon Total Maximum Daily Load to EPA. EPA approved the TMDL on September 9, 2004. The TMDL addressed nutrients, nuisance algae and dissolved oxygen, pesticides (DDT, DDD and dieldrin), sediment, temperature and total dissolved gas. The TMDL noted the Snake River was water quality limited for mercury from RM 409 to 188. However, the mercury TMDL for the Snake River- Hells Canyon reach was postponed due to a lack of water column data so there are no load allocations or wasteload allocations for mercury.

The Hells Canyon Complex received allocations for dissolved oxygen, pesticides, temperature and total dissolved gas, as discussed below.

### **6.1.1 Nutrients, nuisance algae and dissolved oxygen:**

According to the Snake River Hells Canyon TMDL, “The Upstream Snake River segment (RM 409 to 335), the Brownlee Reservoir segment (RM 335 to 285) and the Oxbow Reservoir segment (RM 285 to 272.5) of the SR-HC TMDL reach are listed for nutrients on the state 303(d) lists for this TMDL.” To address elevated nutrient concentrations in the Snake River, total phosphorus waste load allocations and load allocations were set for sources in the upstream Snake River segment (RM 409 to 335) and the tributaries equivalent to a concentration limit of 0.07 mg/l total phosphorus. In addition, the TMDL set a dissolved oxygen load allocation for Brownlee Reservoir (RM 335 to 285) to offset the calculated reduction in assimilative capacity due to the Hells Canyon Complex reservoirs.

The dissolved oxygen allocation requires the addition of 1,125 tons of oxygen ( $1.02 \times 10^6$  kg) into the metalimnion and transition zone of Brownlee Reservoir (approximately 17.3 tons/day (15,727 kg/day) (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(Page 450). As noted in the TMDL, the load allocation does not require direct oxygenation of the metalimnetic and transition zone waters. The allocation can be accomplished through equivalent reductions in total phosphorus or organic matter upstream.

### **6.1.2 Pesticides:**

At the time of the TMDL, the Snake River was considered water quality limited (Idaho DEQ) for pesticides from RM 285 to 272.5 (Oxbow Reservoir). Pesticides of concern were DDT and dieldrin, both of which are banned and no longer in use in the United States. The TMDL established load allocations for legacy application and transport of DDT at less than 0.33 kg/year for Brownlee and Oxbow Reservoirs. Load allocations for legacy application and transport of dieldrin were established at less than 1.0 kg/year for Brownlee and Oxbow Reservoirs (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(page ii).

### **6.1.3 Temperature:**

The Snake River Hells Canyon TMDL notes, “The Snake River is listed from RM 409 to 188 for temperature. Elevated summer water temperatures have been measured in both the Upstream Snake River segment near Weiser, Idaho (RM 351), in the Hells Canyon Complex reservoirs, and in the Downstream Snake River segment prior to the construction of the dams” (page iii). The beneficial uses and applicable temperature criteria have changed since approval of the Snake River Hells Canyon TMDL. The section “Water Quality Parameters of Potential Concern” discusses the beneficial uses and temperature criteria applied to the water quality certification.

### **Salmonid rearing/Cold water aquatic life criteria**

When the Snake River Hells Canyon TMDL was written, the applicable designated use for the Snake River below the Hells Canyon dam was salmonid rearing/cold water aquatic life. The applicable temperature criterion was 17.8° C (expressed in terms of a 7-day average of the maximum temperature). As noted in the TMDL, “Modeling work completed by IPCo (IPCo, 2002b) has shown that if the water inflowing to Brownlee Reservoir at RM 335 were at or below numeric temperature targets for salmonid rearing/cold water aquatic life, water leaving the Hells Canyon Complex at Hells Canyon Dam would also be at or below numeric temperature targets for salmonid rearing/cold water aquatic life, regardless of the temperature shift specific to the Hells Canyon Complex (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(Page 465).” Because of this analysis, the TMDL notes, “no requirement for temperature adjustment, specific to salmonid rearing/cold water aquatic life use has been identified for the Hells Canyon Complex dams” (page 465).

**Salmonid Spawning criteria**

According to the Snake River Hells Canyon TMDL, “Water temperature modeling by IPCo shows that even if the inflowing water temperature were less than or equal to numeric criteria for salmonid rearing/cold water aquatic life uses, the water exiting the Hells Canyon Complex would not meet the salmonid spawning criteria (although by only a small margin) because of the temporal shift created by the Hells Canyon Complex.”

The TMDL further notes, “It is, therefore, concluded that the responsibility for exceeding the salmonid spawning criteria is specific to the presence and operation of the Hells Canyon Complex dams” (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(page 469). The TMDL further notes “The entire thermal load allocation consists of the required change in temperature (such that the temperature of water released from Hells Canyon Dam is less than or equal to the flow-weighted average temperature at RM 345, or the 13 °C daily maximum temperature target for salmonid spawning) and the allowable temperature change described by the preceding equation. The entire load for the Downstream Snake River segment (RM 247 to 188) is allocated to the Hells Canyon Complex of dams owned and operated by IPCo.” (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(Page 470).

**6.1.4 Total dissolved gas:**

At the time of TMDL development, total dissolved gas was not a 303(d) listed pollutant. However, the TMDL addresses total dissolved gas due to a public request. According to the TMDL, spill at Brownlee and Hells Canyon Dams is the source of elevated total dissolved gas within the lower SR-HC TMDL reach. The TMDL assigned a load allocation for total dissolved gas to the Hells Canyon Complex based on the applicable total dissolved gas criterion, (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004) (page 473), as summarized in Table 13, below:

**Table 13: Total Dissolved Gas TMDL Allocation**

<b>Segment</b>	<b>Load Allocation</b>
Oxbow Reservoir segment (RM 285 to 272.5)	less than 110% of saturation at the edge of the aerated zone below Brownlee Dam*
Hells Canyon Reservoir segment (RM 272.5 to 247)	less than 110% of saturation at the edge of the aerated zone below Oxbow Dam*
Downstream Snake River segment (RM 247 to 188)	less than 110% of saturation at the edge of the aerated zone below Hells Canyon Dam*

# 7 Evaluation of Compliance with Water Quality Standards

## 7.1 Water Quality Parameters Not of Concern

Table 14 identifies water quality parameters not likely affected by the operation of Project facilities. For this reason, and as further explained below, DEQ is reasonably assured that the Project operations will not cause or contribute to violations of the water quality standards identified in Table 14.

**Table 14: Parameters Not of Concern**

Parameter	Summary of Criteria	Project Impact Not Expected
Bacteria	OAR 340-041-0009 (1)(a):  (A) A 30-day log mean of 126 E. coli organisms per 100 milliliters, based on a minimum of five (5) samples;  (B) No single sample may exceed 406 E. coli organisms per 100 milliliters.	The Project does not discharge or provide sources of human or animal waste that could be washed into adjacent waters.
Chlorophyll a	340-041-0019 Nuisance Phytoplankton Growth	Hydroelectric dams may influence the aquatic environment by creating conditions that increase algal and plant productivity. The Snake River Hells Canyon nutrient TMDL established chlorophyll a and total phosphorus targets. DEQ expects TMDL implementation to decrease the occurrence of algal blooms, as measured by chlorophyll a in the Snake River and the Project.
pH	OAR 340-041-0124 (1): pH (hydrogen ion concentration). pH values may not fall outside the following range: main stem Snake River: 7.0-9.0.	Impoundments may contribute to pH violations, usually through increased algal populations. However, available data indicates limited violations of the pH criteria. DEQ has reasonable assurance of pH criteria attainment with implementation of the Snake River – Hells Canyon TMDL. See data summary below.
radioisotopes	Not allowed above maximum permissible concentrations in drinking water, or in fish, shellfish, or wildlife tissue [OAR 340-41-007(16)]	The Project does not add radioactive substances to water.
sediment	Bottom deposits deleterious to habitat and aquatic life are not allowed [OAR 340-41-007(13-14)].	Available turbidity data indicate that the turbidity values decrease in the Snake River below the Project.
Total dissolved solids	OAR 340-041-0124 (2) Total Dissolved Solids. Guide concentration listed below may not be exceeded unless otherwise specifically authorized by DEQ upon such conditions as it may deem necessary to carry out the general intent of this plan and to protect the beneficial uses set forth in OAR 340-041-0120: main stem Snake River — 750.0 mg/l.	Based on abiotic processes, the total dissolved solids may increase due to the impoundments. However, available data indicate that the criterion for the Snake River is not exceeded.
Turbidity	OAR 340-041-0036: Turbidity (Nephelometric Turbidity Units, NTU): No more than a ten percent cumulative	The project does not contribute turbidity. See data summary below.

Parameter	Summary of Criteria	Project Impact Not Expected
	increase in natural stream turbidities may be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity.	
Toxics – water column	340-041-0033: Toxic Substances (1) Toxic Substances Narrative; (2) Aquatic Life Numeric Criteria; (3) Human Health Numeric Criteria.	The project impoundments may act to retain pollutants from the Snake River watershed. However, available water quality data indicates that water column data does not exceed aquatic life criteria. In general, the detection limits were above human health criteria.

### 7.1.1 Bacteria:

In the section 401 application, IPC noted that the Snake River Hells Canyon TMDL included an evaluation of bacteria data and no samples exceeded the criteria. Table 15 summarizes the bacteria data evaluated in the TMDL for the 1999 season, upstream of the Hells Canyon complex (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(page 332).

**Table 15: Snake River bacteria data, RM 409 to 285**

RM	Number of Samples	E. coli (#/100 mL)	
		Mean	Maximum
335	3	13	22
340	15	11	53
385	7	18	37
403	8	19	91

Additionally, available data reviewed for the 2012 integrated report indicates no exceedances of the bacteria criteria, as summarized in Table 16.

**Table 16: Snake River integrated report status, fecal coliform data**

	Summer	Fall/Winter Spring
River Mile 244.2 to 268.8	attaining	
River mile 281.1 to 404	attaining	attaining

### 7.1.2 Chlorophyll a:

As noted in the section “Water Quality Impairment in the Snake River” the Snake River is water quality limited for chlorophyll *a* from river mile 268.8 to 404 for the summer and river mile 280.5 to 404 for fall/winter/spring. The Snake River Hells Canyon nutrient TMDL addressed chlorophyll *a* in the summer. A site-specific chlorophyll *a* target of less than 14 ug/L and a total phosphorus target less than or equal to 0.07 mg/L were identified by the TMDL. Attainment of these targets is projected to result in a reduction of roughly 50 percent in algal biomass, as measured by chlorophyll *a* that in turn will result in improvement in dissolved oxygen concentrations in the Snake River upstream and within Brownlee Reservoir. In the TMDL, IPC received an allocation to add dissolved oxygen in Brownlee reservoir to offset reduction in assimilative capacity caused by the Hells Canyon Complex impoundments.

### 7.1.3 pH:

As noted in Table 14, in the mainstem Snake River pH may not fall outside the range of 7.0-9.0. As presented in the § 401 application, most of the pH concentrations measured throughout the Hells Canyon Complex were within the criteria range and the percentage of exceedances decreased from upstream in the Snake River through the complex. Table 17 provides a summary of the pH exceedances (derived from June 14, 2018 application for § 401 certification, page 123).

**Table 17: Percentage of pH criteria exceedances**

Location	Number of Samples	Percent of pH Concentration Measures		
		pH Less than 7	pH Greater than 9	Total
Snake River upstream	1,080	1.1	17.6	18.7
Brownlee Reservoir Inflow Riverine Transition lacustrine	134,062	2.1	3.5	5.6
	512	1.8	12.1	13.9
	3,800	1.5	14.2	15.7
	33,964	2.1	6.5	8.6
lacustrine	96,056	2.2	2.0	4.1
Oxbow reservoir	1,604	0.7	1.6	2.3
Hells Canyon Reservoir	15,910	0.1	3.9	4.0
Snake River Downstream	815	2.3	1.2	3.5

DEQ's 2012 integrated report contains additional pH data. River miles 244.2 to 268.8 are listed as "attaining" pH criteria based on 14 samples collected at US Geological Survey Site 13290450, at Hells Canyon dam.

The Snake River Hells Canyon nutrient TMDL included a total phosphorus target of 0.07 mg/L and a chlorophyll *a* target of 14 ug/L to address nuisance algae. In the § 401 application, IPC presented results of a mass balance model used to estimate pH for various rates of photosynthesis. Model results indicated lower pH values with lower rates of photosynthesis through the implementation of the Snake River Hells Canyon nutrient TMDL. IPC also simulated pH values using the CE-QUAL-W2 model. Consistent with the mass balance approach, higher algal biomass produced higher pH values. IPC proposed that, following full implementation of the Snake River – Hells Canyon nutrient TMDL, and attainment of the total phosphorus and chlorophyll *a* targets, the potential for pH values above targets will decrease.

The available pH data indicates few exceedances of the pH criteria. Modeling indicates that implementation of the Snake River Hells Canyon nutrient TMDL will improve pH levels. Based on these results, DEQ has reasonable assurance that the pH criteria will not be exceeded through the Hells Canyon complex.

### 7.1.4 Sediment:

The Snake River Hells Canyon TMDL noted, "The available data show that over 95% of the sediment loading into the SR-HC TMDL reach originates in the Upstream Snake River segment (RM 409 to 335)" (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(Page r). The Snake River Hells Canyon TMDL established targets of no more than 50 mg/L total suspended solids (TSS) as a monthly average and less than or equal to 80 mg/L TSS for no more than 14 days to protect aquatic life uses. Load allocations to meet the TMDL targets have been established for those tributaries

and nonpoint sources (drains) that exceed target values at their inflow to the Snake River. No sediment allocation was set for the Project.

### 7.1.5 Total dissolved solids:

IPC measured total dissolved solids in the Snake River and throughout the Hells Canyon Complex. In the application for section 401 certification IPC cited the Oregon criterion as 100 mg/L. However, for the mainstem Snake River, the guide concentration is 750.0 mg/L. All available data indicates compliance with the guide concentration of 750 mg/L. Table 18 summarizes the data.

**Table 18: Total dissolved solids data (IPC application, Table 6.8-1)**

TDS (mg/L)	1992 Data			1995 Data		
	Inflow (RM 330)	Brownlee Reservoir Outflow (RM 284.4)	Hells Canyon Reservoir Outflow (RM 247)	Inflow (RM 340)	Brownlee Reservoir Outflow (RM 284.4)	Hells Canyon Reservoir Outflow (RM 247)
Number of Samples	9	7	7	10	11	Data not available
Minimum	240	265	274	173	138	Data not available
Maximum	375	340	325	450	413	Data not available
Mean	321	309	301	335	283	Data not available

### 7.1.6 Turbidity:

In the application for section 401 certification, IPC notes that the project does not contribute to turbidity in the Snake River. The project reduces turbidity through settling suspended solids. IPC provided turbidity data collected in the Snake River from 1992 to 1997, and these data are summarized below (Idaho Power Company, 2018) (page 146). The data indicate that the mean turbidities decreased through Brownlee and Oxbow reservoirs. The maximum turbidity decreased through the Hells Canyon Complex (Table 19).

**Table 19: Snake River turbidity data (June 2018 IPC application, adapted from Table 6.7-1)**

	Snake River Upstream RM 409 to 343.1	Brownlee Reservoir RM 343 to 284.6	Oxbow Reservoir RM 284.5 to 272.5	Hells Canyon Reservoir RM 272.4 to 247.6	Snake River Downstream RM 247.5 to 247
	NTU	NTU	NTU	NTU	NTU
Number of Samples	213.0	978.0	265.0	434.0	174.0
Minimum	0.9	0.4	0.4	0.4	0.5
Maximum	291.0	213.0	50.2	48.9	41.7
Mean	39.0	13.5	4.1	5.4	5.0

### 7.1.7 Toxics – water column:

The Snake River is water quality limited for mercury based on fish advisories. Section 7.2 “water quality parameters of potential concern” discusses mercury in detail.



As noted earlier, the Snake River is considered water quality limited for DDT and dieldrin, from RM 285 to 272.5 (Oxbow Reservoir). The Snake River – Hells Canyon TMDL set allocations for DDT and dieldrin.

Although the TMDL only addressed DDT and dieldrin, IDEQ, DEQ and US Fish and Wildlife Service wanted to determine whether other pollutants were present and exceeded criteria in the water column in Brownlee Reservoir. Specifically, the three regulatory agencies were concerned about concentrations of toxic pollutants in the hypolimnion of Brownlee Reservoir, which could be transported downstream if water in the hypolimnion was accessed to cool the Snake River below Hells Canyon dam. IPC, IDEQ, DEQ and FWS collaborated to develop a list of parameters for analysis in Brownlee Reservoir. The list contained more than 470 parameters including both organic and inorganic parameters. In 2010 and 2011, IPC sampled the Brownlee Reservoir water column. Study details and results are contained Exhibit 6.6-1 of the June 2018 application. The results were compared with Oregon’s water quality criteria for the protection of aquatic life (OAR 340-041-8033 Table 30). Table 20 summarizes maximum values for inorganic parameters. The acute freshwater criterion for Cadmium is expressed as “total recoverable” and is a function of hardness (mg/L) in the water column. The chronic freshwater criterion for Cadmium is expressed in terms of “dissolved” concentrations in the water column and is expressed as a function of hardness (mg/L) in the water column

The freshwater criterion for copper is expressed in terms of “dissolved” concentrations in the water column and is calculated using the Biotic Ligand Model. The Biotic Ligand Model uses multiple ambient water quality parameters to derive 1-hour acute exposure (CMC) and 96-hour chronic exposure (CCC) water quality criteria (IWQC) for copper based on the site-specific water chemistry that determines the toxicity of copper to aquatic life.

The remaining hardness-dependent metals criteria are expressed as dissolved. The data were analyzed as total but are compared to the dissolved criteria, as appropriate.

**Table 20: Inorganic Criteria and Brownlee Reservoir Maximums (IPC application, adapted from Table 5, Exhibit 6.6-1)**

Parameter	Hardness (mg/L)	Oregon Aquatic Life Criteria (ug/L)				Maximum value for all locations	
		Acute	Note	Chronic	Note	Maximum	LOQ <sup>4</sup> (ug/L)
Arsenic	Not applicable	340	Dissolved concentration, total inorganic arsenic	150	Dissolved concentration, total inorganic arsenic	6.4	0.500
Cadmium	Used 171 mg/L <sup>5</sup>	7.2	Total recoverable, hardness dependent	0.36	Dissolved concentration, hardness dependent	ND	0.080
Chromium III	Used 171 mg/L	884	Dissolved concentration,	115	Dissolved concentration,	ND	1.000

<sup>4</sup> The LOQ, or limit of quantification is often used interchangeably with the term MRL. The MRL is Method Reporting Limit. This is the minimum level of detection for which the lab conducting the analysis feels confident in reporting results. The MRL concentrations vary based on the laboratory method used and the specific chemical analyzed.

<sup>5</sup> For samples recorded at non-detect (ND) a hardness of 171 mg/L was used to calculate the criteria. This hardness was the lowest hardness recorded and would result in the most stringent criteria.

Parameter	Hardness (mg/L)	Oregon Aquatic Life Criteria (ug/L)		Chronic	Note	Maximum value for all locations	
		Acute	Note			Maximum	LOQ <sup>4</sup> (ug/L)
			hardness dependent		hardness dependent		
Chromium VI	Not applicable	16	Dissolved concentration	11	Dissolved concentration	ND	10.000
Copper	201	based on BLM, insufficient data to calculate criterion	Dissolved concentration,	based on BLM, insufficient data to calculate criterion	Dissolved concentration,	1.10	0.500
Iron		NA		1000		221.0	50.000
Lead	201	115	Dissolved concentration, hardness dependent	4.5	Dissolved concentration, hardness dependent	0.14	0.100
Selenium	171	13 <sup>6</sup>	Dissolved concentration	4.6	Dissolved concentration	0.70	0.500
Silver	Used 171 mg/L	8.1	Dissolved concentration, hardness dependent	0.10	Dissolved concentration	ND	0.500
Zinc	Used 171 mg/L	185	Dissolved concentration	186	Dissolved concentration	ND	5.000

Acute and chronic criteria for the protection of aquatic life are contained in Table 30 in OAR 340-041-8033. Criteria for ammonia are pH and temperature dependent. The acute criteria in Table 30(a) apply in waterbodies where salmonids are a designated use in OAR 340-041-0101 through OAR 340-041-0340. The chronic criteria in Table 30(c) apply where fish and aquatic life is a designated use. It is not necessary to account for the presence or absence of salmonids or the presence of any early life stage of fish for the chronic criteria. Using pH and temperature data collected with ammonia samples, the criteria may be determined from Table 30(a) and 30(c) as follows in Table 21:

**Table 21: Ammonia samples to determine the criteria from Table 30(a) and 30(c)**

	Hypolimnion		Discharge
	RM 296	RM 286	RM 283.9
pH	8.00	7.90	7.71
Temperature (C°)	6.10	5.90	16.40
Acute criterion (mg/L)	5.6	6.8	9.3
Chronic criterion (mg/L)	1.8	2.1	1.5
<b>Total ammonia as nitrogen (mg/L) Results</b>	<b>0.43</b>	<b>0.11</b>	<b>0.03</b>

As seen above, the total ammonia results are well below the applicable aquatic life criteria.

<sup>6</sup> Value explained in DEQ memo "Implementation Instructions for Selenium" downloaded from <https://www.oregon.gov/deq/FilterDocs/sToxicsSelenium.pdf> 10/23/2018

The results from Brownlee Dam discharge samples, which represent water primarily drawn from the upper and middle levels of the reservoir (i.e., epilimnion and metalimnion), were compared with the results from samples collected in the lower depths of Brownlee Reservoir (i.e., hypolimnion). In general, concentrations of most of the parameters tested, including most inorganic toxics and all organic toxics, were lower in the hypolimnion compared to the discharge. Table 22 summarizes the results for selected organic toxics measured in 2011 in the Brownlee Reservoir hypolimnion (IPC-1, IPC-2, and IPC-3) and Brownlee Reservoir Discharge (IPC-4, IPC-5 and IPC-6). Exhibit 6.6-1 of the June 14, 2018 application for water quality certification summarizes additional results from the toxics. As seen in Table 23, for most parameters, the method detection limit and limit of quantification were higher than the applicable human health criteria. The results for chlordane, sampled at IPC-4 exceeded the human health criterion. Mercury levels were higher in the hypolimnetic waters, as seen in Table 33.

Table 22: Results for select organic compounds in ng/L

Result by TDI- Brooks (except as noted)	IPC-1	Flag	IPC-2	Flag	IPC-3	Flag	IPC-4	Flag	IPC-5	Flag	IPC-6	Flag	MDL	LOQ
Atrazine (UI)	ND		ND		ND		ND		14	E	14	E	--	25
Desethyl Atrazine (UI)	ND		ND		ND		ND		30	V	30	V	--	25
Chlordane	ND		ND		ND		0.82		ND		ND		--	--
Alpha-chlordane	ND		ND		ND		0.82	E	ND		ND		0.70	5
Gamma-chlordane	ND		ND		ND		ND		ND		ND		0.89	5
Chlorpyrifos	0.67	J	0.94	E	ND		0.5	J	0.55	J	0.67	J	0.86	5
dieldrin	ND		ND		ND		ND		ND		ND		0.77	5
Dieldrin (Pace)	ND		ND		ND		0.93	E	0.71	E	ND		0.52	10
DDT	ND		0.07		0.11		ND		ND		0.15		--	--
2,4 DDT	ND		ND		ND		ND		ND		ND		0.8	5
4,4 DDT	ND		ND		ND		ND		ND		ND		0.63	5
4,4 DDE	ND		0.07	J	0.11	J	ND		ND		0.15	J	0.74	5
Endosulfan														
Endosulfan Alpha	ND		ND		ND		ND		ND		ND		0.70	5
Endosulfan Beta	ND		ND		ND		ND		ND		ND		0.61	5
Endosulfan sulfate	ND		ND		ND		0.10	J	ND		0.10	J	0.78	5
Dioxin (2,3,7,8 TCDD) (Pace)	ND		ND		ND		ND		ND		ND		--	10 pg/L
Polychlorinated Biphenyls (PCBs) (Pace)	ND		ND		ND		ND		ND		ND		--	100

Notes: MDL is the lower method detection level provided by the laboratory. LOQ is the Limit of Quantification reported by the lab. UI is University of Idaho Analytical Sciences Laboratory, Moscow, Idaho. Chlordane was reported by TDI-Brooks as "Total Chlordane" as the sum of Alpha-Chlordane and Gamma-Chlordane. No flags or MDL/LOQ values were included with the Total Chlordane result from TDI-Brooks. Pace is Pace Analytical Services, Inc. Minneapolis, Minnesota. DDT was reported by TDI-Brooks as "Total DDT" as the sum of all DDT and DDT breakdown products (DDE and DDD). No flags or LOQ/MDL values were included with the Total DDT result from TDI-Brooks. A dash (--) in the result columns indicates the analysis for that specific compound requested by DEQ was not run or reported by any laboratory. A dash (--) in the LOQ/MDL columns indicates no values were provided by laboratory because the result was reported as the sum of other analyses. ND indicates "non-detect" meaning the parameter was not detected below the MDL, as requested by DEQ. A Flag of "E" indicates an estimated value detected above the MDL but below the LOQ, as requested by DEQ. A Flag of J indicates the parameter was detected below the MDL.

**Table 23: Comparison of results to criteria for selected organic compounds**

Parameter	Maximum Concentration (ug/l)	Flag	Human Health Criterion - Water + Organism (µg/L)	Human Health Criterion - Water + Organism (µg/L)	Aquatic Life Criterion - Acute	Aquatic Life Criterion - Chronic
Chlordane	0.00082		0.000081	0.000081	2.4	0.0043
Chlorpyrifos	0.00094	E	NA	NA	0.083	0.041
dieldrin	0.00093	E	0.0000053	0.0000054	0.24	0.056
4,4 DDT	ND		0.000022	0.000022	1.1 <sup>7</sup>	0.001
Endosulfan Alpha	ND		8.5	8.9	0.22	0.056
Endosulfan Beta	ND		8.5	8.9	0.22	0.056
Dioxin (2,3,7,8 TCDD)	ND		0.00000000051	0.00000000051		
Polychlorinated Biphenyls (PCBs)	ND		0.0000064	0.0000064	2 <sup>8</sup>	0.014

## 7.2 Water Quality Parameters of Potential Concern

This section provides the detailed evaluation of the Project relationship to each water quality parameter potentially impacted by the Project. The section includes the text of each water quality criterion, a description of the current water quality conditions, IPC's proposal to address the Project's impact on water quality, and DEQ's evaluation of the Project impacts and proposed measures. Table 24 summarizes the parameters of concern.

<sup>7</sup> Aquatic life criterion applies to DDT and its metabolites (the total concentration of DDT and its metabolites should not exceed this value).

<sup>8</sup> This criterion applies to total PCBs.

**Table 24: Parameters of Potential Concern**

<b>Parameter</b>	<b>Criteria</b>	<b>Potential Project Impact</b>
Biocriteria	340-041-0011 Biocriteria Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.	Impact to aquatic communities from flow changes due to project operations; and changes in sediment, gravel and large woody debris recruitment due to impoundment detention. Impact to aquatic communities due to the lack of fish passage because of the presence of impoundments.
Dissolved oxygen	340-041-0016 Dissolved Oxygen Dissolved oxygen (DO): No wastes may be discharged and no activities may be conducted that either alone or in combination with other wastes or activities will cause violation of the following standards: (1) active spawning; (3) cool water aquatic life	Hydroelectric dams may influence the aquatic environment in ways that lower dissolved oxygen concentrations by influencing algal and plant productivity, reducing aeration, increasing the deposition of oxygen demanding organic matter, and by reducing vertical mixing.
Temperature	340-041-0028: Temperature (4) Biologically Based Numeric Criteria are described for designated uses.	Impoundments may alter water temperature and thermal regimes by altering retention times within reaches, by changing water depths and by reducing shading. These factors may change exposure time to heating and cooling influences.
Total dissolved gas	340-041-0031: Total Dissolved Gas: Protects aquatic life from gas bubble disease, caused by water that is supersaturated with atmospheric gases	Water falling from height and plunging deeply into a pool can result in supersaturated water. High TDG is commonly observed below impoundment spillways.
Oil and grease	340-041-0007 Statewide Narrative Criteria  (12) Objectionable discoloration, scum, oily sheens, or floating solids, or coating of aquatic life with oil films may not be allowed;	Oil is used in project turbines and transformers, so there is some risk of oil release at hydroelectric projects.
Statewide Narrative Criteria: Highest and Best Practical Treatment, Prohibition of Deleterious Conditions	340-041-0007 Statewide Narrative Criteria:  (1) [State] (10) The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish may not be allowed;  (12) Objectionable discoloration, scum, oily sheens, or floating solids, or coating of aquatic life with oil films may not be allowed;  (13) Aesthetic conditions offensive to the human senses of sight, taste, smell, or touch may not be allowed;	Hydroelectric dams may influence the aquatic environment by creating conditions that adversely affect fish and other aquatic life and increase algal and plant productivity. Some of the algal blooms may include harmful algal blooms.

Parameter	Criteria	Potential Project Impact
Toxics – methyl mercury, fish tissue	340-041-0033: Toxic Substances (1) Toxic Substances Narrative; (2) Aquatic Life Numeric Criteria; (3) Human Health Numeric Criteria.	The project impoundments may act to retain pollutants from the Snake River watershed.

## 7.2.1 Narrative Standards: Biocriteria and Statewide Narrative Criteria

### 340-041-0011

#### Biocriteria

Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

### 340-041-0002

#### Definitions

(5) "Appropriate Reference Site or Region" means a site on the same water body or within the same basin or ecoregion that has similar habitat conditions and represents the water quality and biological community attainable within the areas of concern.

(6) "Aquatic Species" means plants or animals that live at least part of their life cycle in waters of the state.

(17) "Designated Beneficial Use" means the purpose or benefit to be derived from a water body as designated by the Water Resources Department or the Water Resources Commission.

(19) "Ecological Integrity" means the summation of chemical, physical, and biological integrity capable of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region.

(50) "Resident Biological Community" means aquatic life expected to exist in a particular habitat when water quality standards for a specific ecoregion, basin or water body are met. This must be established by accepted biomonitoring techniques.

(75) "Without Detrimental Changes in the Resident Biological Community" means no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region.

This narrative criterion, the biocriteria standard, recognizes compliance with individual criteria may not fully capture the synergistic effects resulting from multiple stressors and cumulative impacts on aquatic species and other resident biological communities. For example, the standard may be used to guard against cumulative effects of stressful water quality conditions that otherwise meet water quality numeric criteria. Consequently, this biocriteria standard extends broad protections to all beneficial uses and complements numeric criteria to address impacts to aquatic habitats, be that of a physical or chemical nature.

### OAR 340-041-0007

#### Statewide Narrative Criteria

(1) Notwithstanding the water quality standards contained in this Division, the highest and best practicable treatment and/or control of wastes, activities, and flows must in every case be provided so as

to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor, and other deleterious factors at the lowest possible levels.

(10) The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish may not be allowed.

These standards provide protection for humans, wildlife and aquatic life from adverse effects resulting from the presence of deleterious conditions. These standards require the highest and best practicable control of flows to maintain overall water quality at the highest possible levels and other deleterious conditions at the lowest possible level. Further, these standards prohibit deleterious conditions to fish or other aquatic life. Deleterious conditions may include chemical, biological, or physical changes to water quality that result from modifications to flow regimes and impoundments. Narrative criteria may be translated into specific limitations to ensure a proposed activity is consistent with the specific beneficial uses and attributes of a particular body of water.

### **Current Water Quality Status**

The presence and operation of the Project significantly affects water quality in the Snake River Basin, including, among other effects, reducing the diversity and composition of aquatic species, habitat, and vegetation. The Project also has a profound influence on flow magnitude and regimes as well as water elevation changes, which in turn affects aquatic life and the overall health of the aquatic system.

Aquatic ecosystems are inherently complex due to the wide variety of connections between the species within the aquatic community and the roles that each species plays in the ecosystem's function at the wide range of spatial and temporal scales. Fish play a particularly important role in aquatic ecosystems as a top consumer within the food web, and often create linkages between different habitat types (e.g. benthic, riparian, terrestrial, etc.) due to their high mobility and variety of foraging strategies (Vaugh, 2010). Therefore, the loss of fish influences the ecosystem function and compromises the ecological integrity by the alteration of biological, physical and chemical components of the ecosystem.

The Project creates a physical barrier to fish passage by preventing the upstream and downstream migration of anadromous and resident fishes within the Snake River system, which results in chemical and biological alterations to that river and its tributaries. The Project prevents the full complement of native anadromous fish including fall and spring Chinook salmon (*Oncorhynchus tshawytscha*), summer steelhead (*O. mykiss*) and Pacific lamprey (*Lampetra tridentata*) from migrating to historic spawning areas. The Project also prevents connectivity between ESA-listed bull trout (*Salvelinus confluentus*), state sensitive redband trout (*O. mykiss gairdneri*), mountain whitefish (*Prosopium williamsoni*), white sturgeon (*Acipenser transmontanus*) and other native migratory fish species populations isolated above, within, and below the Project. This results in fragmented populations and habitat for these native migratory species, which rely on migration to complete their life cycle and historically used the mainstem Snake River both for rearing and as a migration corridor above, within and below Project dams. The Project isolates resident fish populations, reduces resident fish abundance within some segments, and disrupts resident fish movement between river segments (State of Oregon Hydroelectric Application Review Team, 2006). Productivity is further reduced by increased mortality and loss of native resident fishes due to predation in Project reservoirs and competition with non-native species. Project reservoirs are dominated by non-native centrarchids (family of freshwater ray-finned fish), which are highly piscivorous.

Continued operation of the Project eliminates numerous anadromous and resident fisheries in Oregon. Operation of the Project has resulted in the loss of natural fish production capability in Oregon tributaries and the mainstem Snake River, which has resulted in the loss of fish harvest opportunity for Oregon



anglers. Idaho Power's hatchery mitigation program is intended to mitigate for lost natural production of anadromous fish and lost harvest opportunity for anglers. Idaho Power provides funding for the production of anadromous fish at four fish hatcheries (Oxbow Fish Hatchery, Rapid River Fish Hatchery, Niagara Springs Fish Hatchery, and Pahsimeroi Fish Hatchery). In a 1980 Settlement Agreement, between the states of Oregon, Idaho, Washington, the National Marine Fisheries Service and IPC, IPC was required to provide agreed-upon quantities of fall and spring Chinook salmon and summer steelhead to mitigate the numerical losses caused by the Project. Idaho Power has indicated in its FERC license and section 401 application that it will continue to carry out the required measures in that agreement and DEQ's analysis of compliance with water quality standards accordingly accounts for such as proposed activities that IPC will continue throughout the term of the new license. To-date, IPC's hatchery mitigation program does not adequately mitigate for lost natural production of anadromous fish and lost harvest opportunity for Oregon anglers above Hells Canyon Dam. While Oregon anglers in the lower Columbia River benefit from this production, Oregon anglers and fisheries in the Snake River above and below Hells Canyon Dam receive minimal benefits from these current hatchery mitigation programs. Fishing opportunities below Hells Canyon Dam in Oregon are severely limited by production, planting location, and angler access. Only one of Project mitigation hatcheries is located in Oregon and less than half of the smolts produced at the mitigation hatcheries are released into Oregon waters or boundary waters. Of the adult spring Chinook and steelhead returning to Project mitigation hatcheries, Oregon receives less than half with which to provide fishing opportunities upstream of Hells Canyon Dam. Because access to the Snake River below Hells Canyon Dam is limited, Oregon anglers have fewer opportunities to harvest Chinook and steelhead adults returning to the Snake River below Hells Canyon dam.

Flow fluctuations, ramping, and changes in the seasonal flow regime caused by project operations can affect the quality and quantity of habitat and the food supply that is available to native fish in the Snake River downstream of Hells Canyon Dam including rearing juvenile fall Chinook salmon, bull trout or redband trout. Project ramping occurs when operations require an increase or decrease in flow through the turbines to adjust for shifts in power demand (i.e. load following operations)<sup>9</sup>. Rapid flow fluctuations below powerhouse outfalls due to project operations can have a wide variety of adverse impacts to aquatic ecosystems. Hunter (Hunter, 1992) summarizes and describes the major impacts of hydroelectric project ramping on aquatic biota. Major ramping-related impacts on fish are fish stranding and entrapment, both of which have been observed in the Snake River below Hells Canyon Dam (Brink & Chandler, 2018). Stranding is the "trapping of fish on or beneath unwatered substrate as a result of receding water level" (Wagner, 1999). Entrapment is the separation of enclosed backwater or side-channel areas from the main river channel due to receding river levels. The faster the ramping rate, the higher the likelihood that stranding will occur, altering or obstructing fish migrations, increasing predation, and impacting aquatic macroinvertebrates (Hunter, 1992). Ramping may disrupt spawning activity by washing out or dewatering spawning grounds, resulting in reduced hatching success or the desiccation of eggs due to redd dewatering. During a series of surveys and experiments in the 1970s, Witty and Thompson (Witty & Thompson, 1974) reported observations of fish stranded on gravel bars and in isolated pools and dewatered redds downstream of Hells Canyon Dam. Along shorelines with a shallow gradient, similar to that of the Snake River below Hells Canyon Dam where shoreline depth ranges from 1.5 to 3.0 m (Groves & Chandler, 2003) aquatic organisms may become stranded in small pockets of water or on dewatered substrate, as observed in the Snake River below Hells Canyon Dam where native species have

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<sup>9</sup> Ramping also occurs during Project drawdown for flood control, as well as when outflow is reduced to facilitate reservoir refill. Ramping can also occur when maintenance activities require lowering the reservoirs to access structures. Unplanned outages are an uncontrollable cause of Project ramping. Project start-up after planned and unplanned outages also involves ramping.

been observed in entrapment pools including juvenile fall and spring Chinook, steelhead, mountain whitefish, suckers, and minnows (Brink & Chandler, 2018).

FERC staff noted in the FEIS that entrapment pools could create conditions that result in mortality of fish trapped in pools due to high water temperatures, increased vulnerability to predation, or stranding if the pools drain before they are reconnected to the river. FERC staff recommended that IPC develop and implement a stranding and entrapment monitoring plan to include “monitoring stranding on cobble bars and entrapment of fish in key pools, determining flows needed to reconnect those pools on a daily basis, mark/recapture surveys to monitor fish distribution, survival assessments, and conducting salvage operations as necessary” (Federal Energy Regulatory Commission, 2007)(Page 262).

Since 2005, IPC has performed weekly surveys of entrapment pools during the fall Chinook rearing period and estimates the total number of live fish occupying each pool (Brink & Chandler, 2018). IPC identified 44 sites that disconnect from the main channel to form entrapment pools in the Snake River between Hells Canyon Dam and the mouth of the Salmon River. IPC determined “that the number of juvenile fall Chinook observed in entrapment pools each rearing season depends largely on the number of entrapment pools disconnected/connected from Hells Canyon Dam operations, as well as the number and location of adult fall Chinook redds in the upper Hells Canyon reach from the previous spawning season” (Brink & Chandler, 2018).

In addition, IPC enumerates and records fish stranded in the area surrounding the entrapment pool as water receded. IPC noted that the observed stranding-related fall Chinook mortalities associated with entrapment pool areas have been relatively low each year, ranging from zero fall Chinook in 2011 to 245 fall Chinook in 2014 (Brink & Chandler, 2018).

IPC found that “some shallow entrapment pools experience solar warming during periods of disconnection from the main river channel. Water temperatures in some of these pools have the potential to reach levels that could be lethal to juvenile fall Chinook” (Brink & Chandler, 2018).

IPC proposed and FERC staff agreed that it was appropriate to continue using Johnson Bar (RM 230) as the ramping rate compliance monitoring location. Under the FERC “staff alternative” as described in the FEIS, the maximum variation in river stage would not exceed 1 foot per hour as measured at the Snake River at Johnson Bar gauging station 13290460, except during the March 15 to June 15 fall Chinook rearing period when the maximum variation in river stage would not exceed 4 inches per hour. The FERC FEIS Appendix E and Idaho Power’s response to Additional Information Request (AIR) OP-1(f) indicate that the effects of ramping at the Project are observed miles downstream, as far as Anatone, Washington, at RM 167, downstream of the confluence with the Grande Ronde River, depending on the water year.

The Johnson Bar gauge is located approximately 18 miles downstream of Hells Canyon dam. Generally, attenuation, or reduction in ramping effect, is expected with distance downstream from the powerhouse. The degree of attenuation is a function of the magnitude of the ramping, the morphology of the channel and the amount of inflow from other tributaries. In general, the greater the fluctuation, the farther downstream the effect is observable. However, rivers with confined, bedrock channels lacking significant inflow from tributaries experience little or no attenuation (Hunter, 1992). The Snake River downstream of Hells Canyon Dam is confined with bedrock channels and lacks significant inflow from tributaries until it reaches the Salmon River (RM 188) (Miller, Glanzman, Doran, Parkinson, Buffington, & Milligan, 2003), therefore the effect of Project ramping is observed for a relatively greater distance downstream from the Project. Koski (Koski, 1974) evaluated stage change at three sites during a phased ramp down at the Project from 27,000 cfs to 5,000 cfs over a period of four days. Based on his measurements, stage change at Johnsons Bar varied between 65% - 76% of that at the Hells Canyon Dam gauge with more

change noted at higher flows. Comparison of stage versus discharge between the Hells Canyon Dam gauge and the Johnsons Bar gauge indicates that a ramping rate of one foot per hour at Johnsons Bar would equate to a ramping rate of 1.3 feet per hour at Hells Canyon Dam. This equates to a ramping rate that is 4 inches per hour greater at Hells Canyon Dam than the ramp rate measured at Johnson Bar. Thus ramping will actually exceed one foot per hour for a significant portion of the reach. Hunter (Hunter, 1992) states that the higher the ramp rate, the more likely fish are to be stranded; and a ramp rate as small as one inch per hour at a critical time of year significantly affect an entire year class of fish. Juvenile salmonids are more vulnerable to stranding than adults; and salmonid fry that have recently emerged from the gravel are the most vulnerable (Hunter, 1992).

In the FERC FEIS, the staff alternative includes a measure to develop and implement an operational compliance and water quality monitoring plan. The plan would include “A description of procedures that would be followed to determine a ramping rate at the new gage site that is equivalent to any ramping rate specified for other locations in the new license” (Federal Energy Regulatory Commission, 2007)(Page 40).

The Hells Canyon reach provides the majority of the fall Chinook spawning habitat that is currently accessible to anadromous fish in the Snake River basin. Flows released from Hells Canyon dam affect the quality and quantity of spawning habitat that is available to fall Chinook salmon in the Snake River between Hells Canyon dam and Lower Granite reservoir. Since 1991, IPC has implemented a flow program to enhance spawning and incubation conditions for fall Chinook salmon in the Hells Canyon reach. To prevent redds from dewatering during the spawning season IPC maintains steady flow conditions. The spawning season flow has typically been between 9,000 and 13,000 cubic feet per second, and is determined each year before spawning begins based on forecasted inflows to Brownlee reservoir, predicted hydrologic-year type (low, medium, or high), and availability of habitat (Federal Energy Regulatory Commission, 2007)(Page 243). After spawning has ended, IPC maintains a minimum flow that protects the most shallow redd from being dewatered until fry have emerged from the gravel.

In the FERC FEIS, the staff alternative requires that the flows to be maintained below Hells Canyon dam during the fall Chinook spawning season must be between 8,500 and 13,500 cubic feet per second, at a level selected (based on runoff forecasts) to ensure that spawning fall Chinook salmon redds are created at elevations that are protected during the winter peak load period. DEQ concurs with the requirement for the minimum flows during the fall Chinook spawning season. The program provides a stable environment for spawning adults, thereby reducing the potential for redd abandonment that might occur if flows fluctuated wildly. Stable flows during spawning and incubation will protect shallow redds from potential desiccation, which could result in mortality loss of 100% (State of Oregon Hydroelectric Application Review Team, 2006).

The Project’s significant impact to beneficial uses in Oregon tributaries upstream of the Hells Canyon Dam is of particular concern. Historically, over one million adult anadromous Pacific salmon and steelhead spawned and reared in the Snake River and its tributaries upstream from Hells Canyon Dam, including the Pine, Powder, Burnt, and Owyhee and Malheur river basins in Oregon. Project dams currently interrupt or prevent the safe, timely and effective passage on migratory fish upstream, downstream and between Project segments. The Project forms the upstream boundary of anadromous fish migration and production in the Snake River basin, eliminating access to and reducing available spawning, rearing, and holding habitat. Anadromous fish species were extirpated from the Snake River and Oregon tributaries by the construction and operation of the HCC. The Project therefore restricts the historic range and distribution of native resident and anadromous fish, which rely on migration to complete essential life history requirements. The loss of naturally spawning spring Chinook salmon and summer steelhead in Oregon tributaries above Hells Canyon Dam has resulted in the loss of ecological integrity through an unnatural change in the species composition and reduction of species diversity in

these tributaries. Species in a naturally occurring community evolved to coexist together, and each species plays an important role in the ecosystem function. Therefore, the loss of any species alters the balance of resource partitioning and use within the ecological community. Beyond that, the dams changed habitats that were historically riverine to reservoirs that create different environmental conditions for the resident species that continue to navigate through the Project. The reservoirs harbor non-native predators that prey on the resident native migratory fish. When resident native migratory fish move from one stream to another (such as from Pine Creek to Indian Creek) they have to move through Hells Canyon reservoir and are vulnerable to predation.

The Snake River basin tributaries above Hells Canyon Dam were once home to native runs of summer steelhead and spring Chinook salmon. The tributaries above Hells Canyon Dam historically produced an estimated one million spring/summer Chinook salmon and 200,000 summer steelhead (Chapman & Chandler, 2003). These runs had declined by the time the Project dams were built (1958-1967), but were still significant. At the time of Project construction, estimated production was 2,750 steelhead and 300 spring Chinook salmon in Pine Creek (Oregon Fish Commission, 1958) and 1,550 Chinook salmon and 3,700 steelhead in Eagle Creek (Powder River basin). Goose and Daly creeks and the Burnt River also supported steelhead.

As seen in Figure 5, Pine and Eagle creeks are in the Powder Basin (as defined in OAR 340-041). Both Pine and Eagle creeks currently support resident salmonids. All perennial streams that flow to Pine Creek and the Powder River that supported Chinook salmon and steelhead spawning or rearing at the time of Project construction currently support healthy resident redband trout populations (Chandler, Wilkison, & Richter, Technical Report Appendix E.3.1-7, Chapter 1, 2003). Bull trout are present in several of these Pine Creek tributaries (Chandler, Wilkison, & Richter, Technical Report Appendix E.3.1-7, Chapter 1, 2003). The presence of trout populations in several tributaries in Pine Creek and Eagle Creek indicate that water quality may likely be sufficient to support anadromous salmonids. Surplus hatchery steelhead planted in Hells Canyon reservoir have been observed spawning in Pine Creek, indicating that the habitat and water quality in Pine Creek is currently suitable to support spawning steelhead.<sup>10</sup>

Pine Creek is located in Baker County in Northeast Oregon, and enters the Snake River at the upstream end of Hells Canyon Reservoir (RM 271) (Figure 5). Pine Creek is 36 miles long and originates in the Eagle Cap Wilderness at Pine Lakes. The watershed drains 300 square miles of the southeastern slope of the Wallowa Mountains. Major tributaries to Pine Creek include North Pine Creek, Clear Creek, East Pine Creek, and Fish Creek. The majority of the Pine Creek Basin is forested lands (63%). Federally owned lands comprise 68% of the basin and private lands comprise approximately 31%. Water enters the watershed mostly as rainfall and snowfall. Snowmelt produces most of the annual streamflow.

Pine Creek contained runs of spring Chinook salmon, summer steelhead, and Pacific lamprey prior to construction of Hells Canyon Dam (1967). The historical distribution of Chinook salmon and steelhead is believed to include all accessible habitat in Pine Creek Basin. Robert Sayre (1977) testified before FERC on the distribution of spawning for steelhead and spring Chinook in Pine Creek before the closure of Hells Canyon Dam (1961-1966). Sayre reported that the majority of Chinook redds observed from 1961 to 1966 were located in the North Fork Pine system, including Lake Fork Creek and Elk Creek. He also reported that some spawning was occurring in upper Pine Creek and Clear Creek and estimated that these reaches provided 43 miles of spawning habitat for Chinook. Sayre also reported that steelhead spawned throughout the accessible portions of Pine Creek basin and estimated that these reaches provided 113 miles of steelhead spawning habitat (Sayre 1977 in Chandler and Chapman 2003). Currently, the basin contains resident populations of native bull trout, redband trout, and nongame fish. Most large perennial

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<sup>10</sup> J. Zake, ODFW District Biologist, Personal communication

streams in the basin contain resident redband trout, while bull trout inhabit the Upper Pine Creek, Clear Creek, East Pine Creek, and Elk Creek sub-watersheds.

Eagle, Goose and Daly creeks are tributaries of the Powder River. Eagle Creek is located in the downstream portion of the Powder River basin at RM 10 (Figure 5). Its confluence with the mainstem Powder River is just upstream of the Powder River arm of Brownlee Reservoir. The Powder River arm is the lower portion of the Powder River, which was inundated when Brownlee Reservoir was filled. Federal land comprises the majority of the Eagle Creek basin, which is designated a Wild and Scenic River due to its outstandingly remarkable values. The headwaters of Eagle Creek originate within the Eagle Cap Wilderness (Nowak, Powder River Subbasin Plan, 2004). Daly Creek also drains directly into the Powder River arm of Brownlee Reservoir (RM9). Goose Creek enters the Powder River at RM 36.5.

Historically, Chinook salmon spawned in the mainstem Powder River from the headwaters to the lower end of the North Powder Valley (Thompson & Haas, 1960). Parkhurst (Parkhurst, 1950) originally called the Powder River “an excellent salmon stream” with large runs. Historically, Chinook spawned throughout much of Eagle Creek. When Brownlee Dam was completed, Eagle Creek was the primary basin within the Powder River basin that supported anadromous fish. Chinook salmon used Eagle Creek, and steelhead used Eagle, Goose, Daly, and Big creeks. Most large perennial streams within the Eagle, Daly and Goose subbasins currently support resident redband trout. However, the presence of bull trout in Eagle Creek is unknown. In the FERC FEIS, the Staff Alternative includes a survey of the Eagle Creek basin to determine the presence or absence of bull trout with statistical probability (Federal Energy Regulatory Commission, 2007).

Chapman and Chandler (Chapman & Chandler, 2003) estimated potential smolt yield of anadromous fish from subbasins and from reaches of the mainstem Snake River above the Project based strictly on current habitat capability. Chapman and Chandler (2003) reported that a reasonable estimate for potential adult production in Pine Creek in extant habitat condition is about 2,400 steelhead. An estimated 58,176 spring Chinook and 23,353 steelhead smolts could be produced in Pine Creek. Chapman and Chandler (2003) also estimated, based on current habitat conditions, that Eagle Creek could produce 40,007 spring chinook and 16,653 steelhead smolts, based on an estimated 400 adults that may have used the system. Goose and Big Creeks could yield 11,025 steelhead smolts. Oregon Game Commission estimates indicated that Goose and Big creeks could support 290 and 200 adult steelhead, respectively (Chapman and Chandler 2003). However, no life cycle models were used to evaluate the relationship between habitat improvements and fish production. Therefore, with improvements made to habitat quality and quantity, as anticipated under the FERC Staff Alternative, Chinook productivity would be expected to rise considerably.

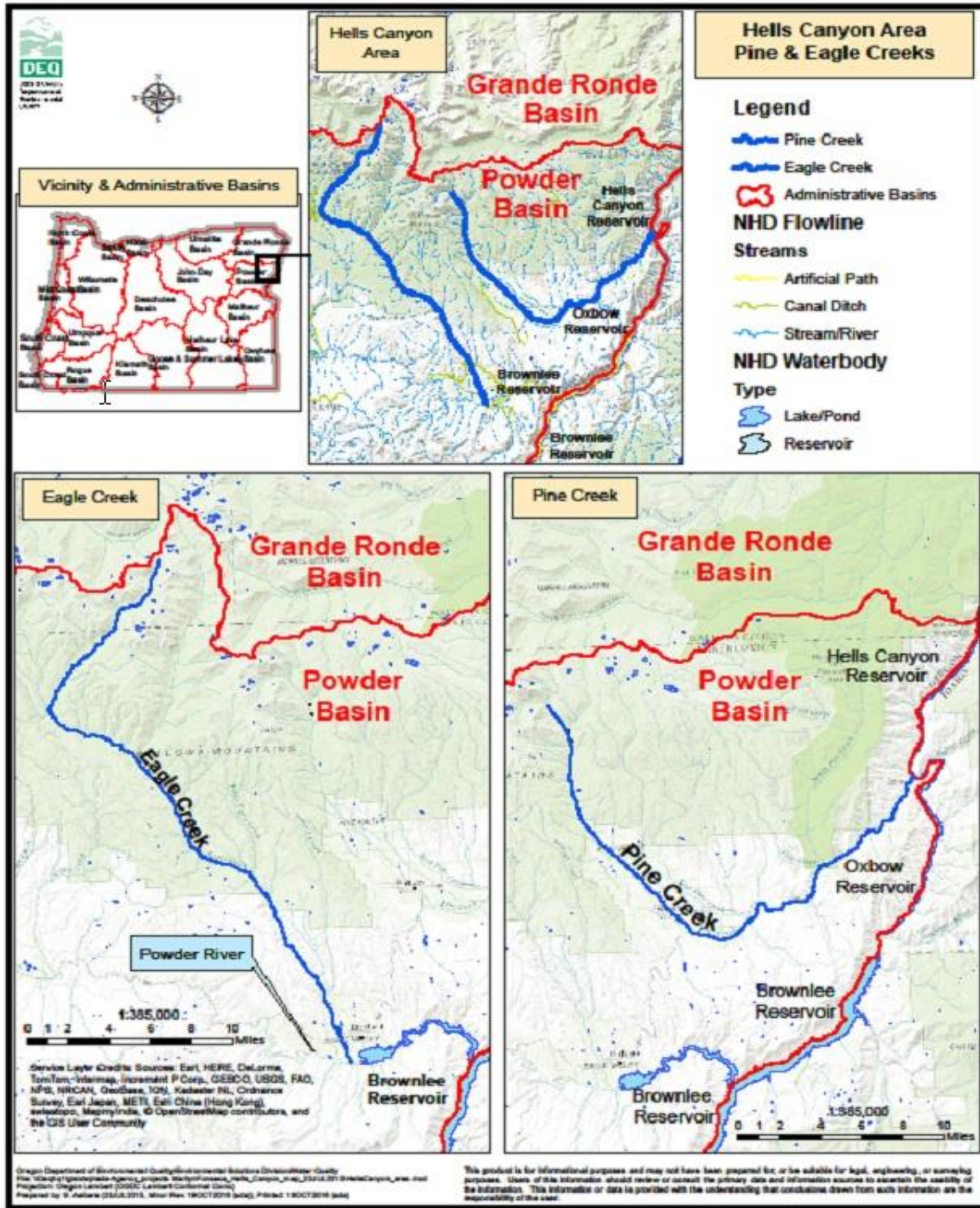


Figure 5: Pine Creek and Eagle Creek



### Macroinvertebrates

It is widely recognized that flow, temperature and sediment alterations associated with rivers regulated by hydroelectric projects can lead to invertebrate assemblages that are ecologically unhealthy (Arthington, Bunn, LeRoy Poff, & Naiman, 2006). Aquatic insect diversity has been found to be strongly and negatively related to the degree of hydropeaking caused by load following operations within rivers affected by hydroelectric dams across the American West (Kennedy, Muehlbauer, & Yackulic, 2016). Specifically, Kennedy et al. (2016) finds that the desiccation of aquatic insect eggs that are dewatered for an hour or more, which result from high ramping rates, causes egg mortality and can create a life history bottleneck, resulting in the elimination of species from the aquatic community. Kennedy et al. (2016) concludes, “reducing hourly discharge variation during periods of peak aquatic insect egg laying should alleviate the life history bottleneck that arises from hydropeaking operations.”

In the *New License application: Hells Canyon Hydroelectric Project*, IPC reported the results of macroinvertebrate sampling in “Technical Appendix E3.1-8 Benthic Macroinvertebrates of Hells Canyon.” The objectives of the study were to describe the existing benthic macroinvertebrates in the Snake River from samples collected upstream from the headwaters of Brownlee Reservoir, through Brownlee, Oxbow, and Hells Canyon reservoirs and in the Snake River from Hells Canyon Dam downstream to the confluence of the Snake and Salmon rivers. Details of the sampling design and field methods are in the Technical Appendix. IPC noted, “In this report of 1998 benthic macroinvertebrate sampling, assessing water quality problems using biomonitoring metrics is not possible because of lack of quantitative sub-sampling and unknown reliability (e.g., no precision, bias, or accuracy estimates) of the data” (Page 18). Additionally, IPC notes, “In this report we did not assess bioindicator metrics, community function, or macroinvertebrate issues related to flow fluctuations. Our inability to address those was the result of loss of sample-specific habitat information because of the compositing technique and potential for bias associated with non-random selection of sampling sites” (Page 20).

DEQ sampled two locations in the Snake River as part of the National River and Stream Assessment (NRSA) study in 2009 (Merrick, 2015). Results are based on evaluations of water quality, biological indicators and physical habitat indicators. Biological indicators include macroinvertebrates, fish assemblage and periphyton (bottom dwelling algae found attached to riverbeds, rocks, plants and woody debris). Physical habitat indicators include canopy cover, riparian vegetation, sand and fine sediment, streambed stability, fish habitat complexity (calculated from measurements of near shore fish habitat including large woody debris, undercut banks, boulders and tree roots) and riparian human disturbance. DEQ evaluated each indicator using comparisons to conditions found at reference or least-impaired sites in wadeable streams. The reference condition approach sets expectations (i.e. benchmarks) for indicators based on the distribution of values found at reference sites. DEQ notes, “The population of DEQ reference sites used to assign condition to all indicators in this assessment (with the exception of periphyton) are all wadeable, 1<sup>st</sup> through 5<sup>th</sup> order streams. Typically, these streams are high gradient in the upper watershed. There is a challenge in finding low-gradient larger rivers and streams in reference or least disturbed condition as these tend to be areas with greater human disturbances” (Merrick, Oregon’s National Rivers and Streams Assessment 2008-2009, 2015) (Page 18). DEQ notes that while the dataset of reference sites is based on wadeable streams, the dataset is still informative to examine sampling results in the Snake River. DEQ staff note, “We can use them in an informative basis by examining how divergent the results are from reference condition.” In the case of the Snake River sites (see Table 25), the observed/expected results from 2009 sampling were among the lowest of all streams and rivers assessed. These data indicate the macroinvertebrate, fish assemblage and periphyton conditions are poor at the two locations sampled in the Snake River. Looking beyond observed/expected data, one can examine the macroinvertebrate data in more detail. As noted by DEQ staff:

1. “Total richness: this is a measure of the total number of unique macroinvertebrate taxa observed in a sample. The ability to support high numbers of taxa is perhaps the single most commonly used measure of ecological integrity. Low richness is the most easily observed sign of

impairments to biological assemblages. Out of all samples in the Biomonitoring database, the average total richness was approximately 40 unique taxa. The two samples collected below Hells Canyon Dam showed total richness of 8 and 9 taxa. This exceedingly low, suggesting extreme disturbance.

2. Total abundance: The ability to support robust populations is another simple and effective measure of ecological condition. Low abundances (or densities) are commonly used as indications of poor conditions. Our laboratory methods target a minimum of 500 individual macroinvertebrates to be subsampled from our field collections. FW08OR025 showed 63 total individuals. FW08OR064 had only 22 total individuals. These are incredibly low numbers. Only 52 and 10 samples (respectively) in the Biomonitoring database had lower total abundances than these Snake River samples.
3. Sensitive/Tolerant taxa: Looking across the specific taxa observed in a sample, we can make an assessment of ecological condition by the presence of sensitive taxa (those intolerant of disturbance) and tolerant taxa (those that can withstand disturbance). There is not a single sensitive taxa observed in the list of taxa collected. In fact, the majority of the taxa observed are considered tolerant, with the remaining taxa considered of intermediate tolerance.”<sup>11</sup>

DEQ field staff noted that the poor condition of macroinvertebrates and periphyton are likely explained by the constant raising and lowering of the flows and that was the biggest issue observed during DEQ sampling. Staff also noted that the fish were dominated by exotics that are tolerant to poor water quality (high temperatures, DO swings, etc.).<sup>12</sup>

Available data indicate that habitat measures such as fish habitat complexity, bed stability and percent fines are good. DEQ staff noted that the habitat was not impaired, in the sampled areas, compared to wadeable streams.

**Table 25: Snake River assessment results<sup>13</sup>**

<b>Site ID</b>	<b>FW08OR025</b>
River Mile	217.1
Date Sampled	14-Sep-09
Fish Habitat Complexity	0.238636
Condition based on DEQ Ref. sites	Good
Macroinvertebrate O/E model score	0.168906
Condition based on DEQ ref. sites	Poor
Fish Assemblage Tolerance score	3.98
Condition based on DEQ ref. sites	Poor
Periphyton MMI score	35.15
Condition based on EPA ref. sites	Poor
<b>Site ID</b>	<b>FW08OR064</b>
River Mile	241.2
Date Sampled	11-Sep-09
Fish Habitat Complexity	0.586364
Condition based on DEQ Ref. sites	Good
Macroinvertebrate O/E model score	0.113537
Condition based on DEQ ref. sites	Poor
Fish Assemblage Tolerance score	2.62
Condition based on DEQ ref. sites	Poor

<sup>11</sup> Personal communication, via email, from Shannon Hubler, DEQ LEAD staff, email dated 4/17/2017.

<sup>12</sup> Personal communication, via email, from Shannon Hubler, DEQ LEAD staff, email dated 4/7/2016.

<sup>13</sup> Email received from DEQ LEAD staff, Excel file ‘Snake2009.xls’, received 1/26/2015



Periphyton MMI score	33.2
Condition based on EPA ref. sites	Poor
<b>Site ID</b>	<b>FW08OR025</b>
River Mile	217.1
Date Sampled	14-Sep-09
Streambed Stability or Relative Bed Stability (RBS)	0.900434
Condition based on DEQ ref. sites	Good
% Fine Sediment	0
Condition based on DEQ ref. sites	Good
% Sand and Fine Sediment	0
Condition based on DEQ ref. sites	Good
<b>Site ID</b>	<b>FW08OR064</b>
River Mile	241.2
Date Sampled	11-Sep-09
Streambed Stability or Relative Bed Stability (RBS)	0.320492
Condition based on DEQ ref. sites	Good
% Fine Sediment	0
Condition based on DEQ ref. sites	Good
% Sand and Fine Sediment	0
Condition based on DEQ ref. sites	Good

While IPC was unable to address possible changes to macroinvertebrate conditions due to flow fluctuations, FERC did evaluate the effect of daily dewatering on invertebrates. As noted by FERC “numerous investigators have found that periphyton and invertebrate production can be greatly reduced in areas of the streambed that are subject to daily dewatering from load following operations” (Federal Energy Regulatory Commission, 2007)(Page 231). FERC noted, “we conclude that invertebrate standing crops are likely reduced primarily in areas that are subject to daily dewatering due to reduced periphyton production and from cumulative losses of invertebrates associated with repeated dewatering events” (Federal Energy Regulatory Commission, 2007)(Page 242). FERC estimated that periphyton and invertebrate production may be reduced by approximately 10 to 20 percent upstream of the Salmon River in medium to low flow years, depending on the modeled flow scenario. FERC noted, “These effects would be reduced by about one third by implementing a 6 inches-per-hour ramping rate, and they would be reduced by about three-fourths by implementing a 2 inches-per-hour ramping rate” (Federal Energy Regulatory Commission, 2007)(Page 243). FERC noted the role that invertebrates play as a food source for fall Chinook salmon. FERC noted that because invertebrate production can be greatly reduced in areas that are frequently dewatered, implementing changes to project operations, such as “run-of-river operations or a 2-inches-per-hour or 4-inches per-hour ramping rate would provide a substantial increase in the food that is available in habitat areas that are used by juvenile fall Chinook salmon” (Federal Energy Regulatory Commission, 2007)(Page 258).

### **Applicant’s Proposed Measures**

#### **Macroinvertebrates**

IPC proposed a “Hells Canyon Macroinvertebrate and Periphyton Study” draft study plan. IPC notes, “The overall objectives of this plan are to assess long-term trends in macroinvertebrate and periphyton communities and provide a basis for comparison of communities within the Snake River downstream of the Hells Canyon Complex with communities upstream of the HCC and in another large river system in close proximity (the Salmon River)” (Stephenson, 2018). IPC proposes to conduct trend monitoring with three locations in the Snake River in Hells Canyon. Additionally, IPC proposes to establish a reference station in the Salmon River upstream of the confluence with the Snake River, as well as one in the Swan Falls Reach of the Snake River (to look at upstream conditions). IPC also proposes periphyton sampling following a modified index sampling technique.

### **Entrapment Management Plan**

In lieu of a ramping rate to address stranding and entrapment, IPC proposed an Entrapment Management Plan. IPC's Entrapment Management Plan (Brink & Chandler, 2018) includes (1) Identification of significant entrapment pool areas; (2) Use assessment of high-priority entrapment areas; (3) Documentation of entrapment pool temperatures; (4) Adaptive in-season operational protocols; and (5) Management of total entrapment. Each component is discussed below:

- (1) Identification of significant entrapment pool areas: IPC proposes to conduct annual monitoring of entrapment pools in upper Hells Canyon reach of the Snake River. IPC will assess connection flows of documented entrapment pools influenced by Hells Canyon Dam operations and identify any new entrapment pools.
- (2) Use assessment of high-priority entrapment areas: IPC proposes to survey high-priority entrapment pools weekly between March 15 and June 15 (or until juvenile fall Chinook are no longer observed in entrapment pool areas, which often occurs prior to May 31). During weekly surveys, IPC will document the presence and abundance of all species of fish in each pool, including any stranding mortalities observed immediately adjacent to pools. IPC proposes to complete a yearly estimate of total entrapment and total mortality of all pools surveyed. IPC will also estimate the number of fish mortalities caused by temperature by assuming that if a pool exceeds 26°C, it has resulted in the mortality of all fish assigned to that pool for that day.
- (3) Documentation of entrapment pool temperatures: IPC will monitor water temperature in high-priority entrapment pools deploying temperature loggers in high-use pools each season. IPC will then manage daily water temperatures not to exceed 23°C as described in Section 2.1.4.2. of Brink and Chandler (2018).
- (4) Adaptive in-season operational protocols: IPC will employ several operational protocols to attempt to improve pool conditions for entrapped fish. First, IPC will manage Hells Canyon Dam outflows to reconnect any disconnected pool for at least two (2) consecutive hours daily. Once inflows decrease to the point a pool cannot be reconnected for at least 2 hours daily, fish from that pool will be salvaged (see Section 2.1.4.3 of Brink and Chandler (2018)). Next, IPC will manage daily temperature in high-priority pools not to exceed 23°C. If entrapment pool temperatures are nearing (or may exceed) 23°C, IPC will either (a) shift Hells Canyon Dam peak outflows to connect entrapment pools earlier in the day; or (b) manage Hells Canyon Dam outflows to keep entrapment pools with elevating temperatures connected until the risk of water temperatures exceeding 23°C has decreased.
- (5) Management of total entrapment: IPC will salvage juvenile fall Chinook and juvenile steelhead from entrapment pools that are disconnected and will not be reconnected again during the rearing period (due to low Hells Canyon Dam outflows).

IPC also proposes to extend monitoring of entrapment pools in the upper Hells Canyon Reach after fall Chinook rearing (Idaho Power Company, 2018). IPC will monitor entrapment pools disconnected by Hells Canyon Dam operations (at the time of the survey) biweekly from June 1 through September 30. IPC will record abundance and lifestage (juvenile or adult) of all fish species present (including any mortalities) and water temperature (°C) and dissolved oxygen (milligrams per liter [mg/l]) in the deepest point of each pool. IPC will deploy continuous water temperature loggers in four representative pools throughout the upper Hells Canyon reach.

### **Fall Chinook flows**

IPC proposes to continue operating project outflows during fall Chinook spawning and incubation in the same manner it has since 1991 to protect spawning fall Chinook and the eggs incubating in the gravel. In 1991, IPC began releasing stable flows during the fall Chinook spawning period (Idaho Power Company, 2003). After the spawning period, IPC will maintain a minimum flow equivalent to the elevation of the highest redd until IPC estimates emergence is complete the following spring. IPC will determine the

stable flow levels on a year-to-year basis based on runoff forecasts and will maintain outflows at this level from the second Monday in October through the second Friday in December (Idaho Power Company, 2018)(Table 4.5-1). In *New License application: Hells Canyon Hydroelectric Project*, IPC suggested that “moderate flow fluctuations during the spawning period may be attainable without reducing the availability of spawning habitat or hindering fall Chinook spawning” (Idaho Power Company, 2003)(E.3-123). FERC concluded in section 3.6.2.1 of the FEIS (Federal Energy Regulatory Commission, 2007) that maintaining a stable flow during the spawning season is more protective than a variable flow regime would be, and, in the Staff Alternative, did not amend the current program to allow variation during the season. However, in IPC’s Section 401 Water Quality Application, in *supra* note “d” of Table 4.5-1, IPC indicates that minor deviations from the stable flow may be required to ensure Brownlee Reservoir does not fill prior to the 2nd Friday in December. IPC suggests that it will consult on any deviations with NMFS and expects NMFS to analyze the impact in the Hells Canyon Complex Biological Opinion (Idaho Power Company, 2018).

### **Fish Production, Placement, Monitoring, Habitat Improvements and Evaluation, and Other Water Quality Measures**

In the *New License application: Hells Canyon Hydroelectric Project*, IPC proposes to continue hatchery production of anadromous fish consistent with the 1980 Settlement Agreement discussed above.

In the Settlement Agreement between the State of Idaho, IPC, and Oregon, IPC commits to carrying out the following measures, summarized below:

**Supplementation of Spring Chinook Salmon Hatchery Production:** IPC will construct, operate, and maintain the infrastructure needed to increase the Rapid River Hatchery production of spring Chinook salmon and sustain that increased production. Within three years of FERC license issuance, IPC shall increase production capacity by approximately 800,000 smolts. Within six years of FERC license issuance, and subject to provisions of that Settlement, IPC shall release the additional 800,000 smolts in the Snake River below Hells Canyon Dam and the Little Salmon River.

**Upstream Adult Collection Facility at Hells Canyon Dam:** No later than five years after FERC license issuance, IPC shall modify the existing Hells Canyon trap to construct facilities sufficient to allow safe and efficient means of on-site sorting, handling, enumeration, and holding of multiple species of resident and anadromous fish. IPC shall operate the trap over a range of flows to collect the quantities of adult spring Chinook salmon and summer steelhead necessary, as determined by ODFW, to implement the Placement Plan, as described below.

**Placement of Non-ESA-listed Adult Fish:** Within two years of FERC license issuance, IPC shall annually provide reasonable transportation of Spring Chinook salmon and summer steelhead adults for placement as requested by each respective state.

**Pine Creek Placement, Monitoring, and Juvenile Collection:** Within ninety days of FERC license issuance, IPC shall develop, in collaboration with ODFW and subject to ODFW approval, an anadromous fish placement, monitoring and evaluation plan for Pine Creek. The plan, known as the Placement Plan, shall provide for safe, timely, and effective placement of adult Spring Chinook salmon and summer steelhead into Pine Creek and an evaluation of the juvenile production associated with those placements. Following placement of adult Spring Chinook salmon and summer steelhead into Pine Creek, IPC shall study the effectiveness of agreed-upon release strategies relative to their migration, survival, holding behavior, and spawning. IPC shall fund and implement a pathogen risk assessment of adult fish placements. Beginning one year following adult placement into Pine Creek, IPC shall assess outmigration timing, age of outmigrants, smolts produced per female spawner and basin (or sub-basin) production. IPC shall design and conduct limited research using surrogate

juveniles to monitor movement of outmigrants out of Pine Creek through Hells Canyon reservoir. IPC shall prepare and submit annual progress reports to ODFW that summarize research and findings to date related to adult placement and juvenile collection within three (3) months of completing each annual monitoring period.

**Habitat Improvement and Evaluation in Oregon Tributaries:** Upon FERC's issuance of a new license for the Project, IPC shall establish a Habitat Enhancement Fund totaling \$2 million (2018 dollars) to enhance native salmonid habitat in tributaries to the Powder River (downstream of Thief Valley Dam). IPC shall carry out general and detailed habitat evaluations and assessments to determine the status of habitat necessary to support and identify primary basin habitat features that could be limiting to the production potential of spring Chinook salmon and summer steelhead in the Pine Creek basin and within Powder River tributaries (below Thief Valley Dam).

**Water Quality Enhancement in Snake River or its Oregon Tributaries:** Upon FERC's issuance of a new license for the Project, IPC shall provide ODEQ with funding of \$200,000 per year for 16 years, which ODEQ shall utilize to establish a Water Quality Enhancement Fund totaling \$3.2 million (2018 dollars) to enhance water quality in the Snake River or its tributaries in Oregon.

**Oregon Water Quality Improvement Program (OWQIP):** IPC shall fund a program to result in modifications to existing agricultural land use practices to reduce sediment and phosphorus loading to the Snake, Malheur, and Owyhee rivers. Through the OWQIP, IPC will provide funding to landowners to implement modifications to existing agricultural land use practices within the Malheur or Owyhee River Basin Agricultural Water Quality Management Areas and within areas where agricultural irrigation water has the potential to drain into the lower Malheur, lower Owyhee, or Snake River. Provided qualifying projects are available, IPC will fund the OWQIP for a period of 20 years at a minimum of \$340,000 per year, with total program funding not to exceed a total of \$6.8 million for the 20-year life of the program. The Oregon Soil and Water Conservation Districts must use the existing technical resources provided to the conservation districts by Natural Resource and Conservation Service of the U.S. Department of Agriculture to design and implement the management practices.

#### **DEQ Evaluation:**

##### **Macroinvertebrates**

DEQ habitat data indicates that percent fines, habitat complexity and streambed stability are in good condition below the Hells Canyon Complex. DEQ data indicates that the macroinvertebrate and periphyton assemblages are in poor condition in the Snake River below the Hells Canyon Complex. DEQ staff noticed low abundance of macroinvertebrates collected during sampling events, which took place in the daylight hours of summer. DEQ staff attributed the low abundances to higher flows observed during the daytime, such that the habitat sampled was dewatered overnight. As colonization rates of macroinvertebrates is typically on the scale of weeks to months, the daily ramping of flows limits the suitability of these habitats for macroinvertebrates and periphyton.

DEQ proposes to work with IPC to complete the draft macroinvertebrate and periphyton monitoring plan. The final, DEQ approved plan will allow IPC to delineate the impact zone and to collect trend data.

#### **Entrapment Management Plan**

IPC's proposal to reconnect, for at least two consecutive hours daily, pools that become isolated from the main Snake River channel will protect beneficial uses by allowing juvenile fall Chinook to access rearing habitat and food supply. IPC's proposal to reconnect pools to the main channel may also reduce the

occurrence of stranding due to reduction of water level of the pool, since the pools will be periodically reconnected. IPC's proposal to monitor pool temperatures and manage Hells Canyon Dam outflows to reconnect pools will reduce fall Chinook mortality that may occur due to lethal temperatures in entrapment pools. IPC's proposal to monitor fall Chinook mortality that occurs due to stranding or other causes (such as predation while trapped in pools) will allow IPC to manage total mortality based on the amount of impact (i.e. take) allowed by National Marine Fisheries Service. The weekly reporting proposed by IPC will allow fish managers (i.e. NMFS, FWS and ODFW) to assess the status of the resident biological community and determine whether any observed changes to the community are detrimental. IPC's proposal to survey entrapment pools from June through September will provide reasonable assurance that the project provides water conditions that are sufficient to support aquatic species without detrimental changes in resident biological communities.

### **Fall Chinook flows**

The spawning flow program that IPC has implemented since 1991 and proposes to continue will benefit fall Chinook salmon by maintaining near-optimal flow levels during the spawning period and by preventing dewatering of redds during the incubation period. IPC's proposal to release stable flows from Hells Canyon Dam during spawning and minimum flow based on the highest elevation redd during incubation will keep redds covered with water throughout the spawning and incubation periods. This will reduce the potential for redd abandonment that might occur if flows fluctuate widely. IPC's proposal will provide reasonable assurance that spawning fall Chinook salmon create redds at elevations that will be protected throughout the winter peak load period, and will protect shallow redds from desiccation, which would likely result in 100% mortality of the dewatered redd. Further, stable flows are beneficial to the macroinvertebrate community, which are the source of food for juvenile fall Chinook and other fish species. DEQ finds that IPC's proposal to adaptively manage Hells Canyon Dam outflow during fall Chinook rearing period will protect fall Chinook from deleterious conditions that could lead to mortality and cause detrimental changes in the resident biological community.

### **Fish Production, Placement, Monitoring, Habitat Improvements and Evaluation, and Other Water Quality Measures**

The biological criterion is applicable when Project effects obstruct the chemical or physical connectivity necessary to fully support all designated beneficial uses. Currently, Project developments and operations adversely impact the ecological integrity of the Snake River basin through elimination of natural species composition and diversity. Pacific salmon and other anadromous fish, such as steelhead, play an important role in the ecological function of the aquatic systems where they occur. Salmon transport marine derived nutrients and caloric resources from the ocean and estuaries, where they grow, to the freshwater streams where they spawn and die. Salmon carcasses are preyed upon by aquatic and terrestrial organisms at all trophic levels, including microbes, macroinvertebrates, other fish, birds and mammals (Gende, Edwards, Wilson, & Wipfli, 2002). After salmon spawn, their eggs and young also become prey for a variety of species. The biological effect of the elimination of salmon results in the loss of this important energy source which reduces the productivity of the entire ecosystem because there is no other organism that can replace the influx of energy (i.e. marine derived nutrients) provided by salmon. Salmon benefit aquatic ecosystems by physically altering aquatic habitats by excavating gravel to form spawning nests (or redds), redistributing larger substrates, such as gravel and cobble, and flushing fine sediment. This provides clean substrate for their eggs to incubate and enhances macroinvertebrate production. When salmon are eliminated, the redistribution and flushing of sediment may not occur on a regular (i.e. annual) basis or at the same spatial scale. Throughout the end of their life cycle in freshwater ecosystems, salmon release a wide range of chemical components through decomposition and excretion of waste products that are recycled by primary producers. The loss of these nutrients can reduce algal biomass, epilithic

biofilm<sup>14</sup> production, soil respiration and riparian vegetation growth in the typically nutrient-limited ecosystems of the Pacific Northwest (Gende, Edwards, Wilson, & Wipfli, 2002). These ecological effects caused by loss of salmon and other anadromous fish, such as steelhead, can be attributed to tributaries above Hells Canyon Dam, such as Pine Creek, because salmon were historically present in these systems.

Placement of spring Chinook salmon and summer steelhead above Hells Canyon Dam will allow the reestablishment of marine-derived nutrients that will begin to restore the ecological integrity of aquatic habitats in Oregon tributaries. Extirpation of anadromous fish from Oregon tributaries above Hells Canyon Dam eliminated the source of marine-derived nutrients for aquatic habitats upstream of Hells Canyon Dam. The loss of these nutrients throughout the sub-basins in Pine Creek and other Oregon tributaries has reduced the primary productivity of the tributary ecosystems including the aquatic communities, particularly native resident salmonid and macroinvertebrate populations and terrestrial communities.

As noted by FERC “Native resident salmonids (such as redband trout and bull trout) can benefit from marine-derived nutrients through increased primary production or direct consumption of eggs, fry and carcasses (Cedarholm & Kunze, 1999)” (as cited by FERC (Federal Energy Regulatory Commission, 2007)). In addition, the spawning of anadromous fish within their historic habitat in Oregon tributaries above Hells Canyon Dam will provide forage for resident native migratory fish in the forms of eggs, fry, and juvenile steelhead and salmon that would otherwise be unavailable. The timing of anadromous fish life history is uniquely aligned with native resident species. For instance, optimal foraging temperatures for bull trout historically coincided with smolt migration in these tributaries, providing an important early season forage base for adult bull trout at a time when energy reserves are depleted (Chandler, Wilkison, & Ritcher, Technical Report Appendix E.3.1-7, Chapter 4, 2003). The energy and growth accumulated by consumption of forage provided by anadromous fish is expected to allow bull trout to return to tributary habitat as temperatures increase in the summer. It is also expected that that the additional forage provided by anadromous fish will support the fluvial life history of bull trout and redband trout (Chandler, Wilkison, & Ritcher, Technical Report Appendix E.3.1-7, Chapter 4, 2003). The energy and food resources from naturally spawning salmon and steelhead are expected to increase the growth rates, and consequently fecundity, of bull trout and redband trout.

In addition to restoring availability of marine-derived nutrients, placement of anadromous fish in Oregon tributaries will increase natural species composition and diversity, which is expected to improve the ecological function and integrity. The specific conditions and/or limitations set forth in the Certification section IX and the proposed actions of the Applicant in its section 401 application, as supplemented, and the Settlement Agreement ensure the protection of beneficial uses and water quality of the affected waterbodies; the support of aquatic species without detrimental changes in the resident biological communities; minimize conditions deleterious to fish or other aquatic life; and are consistent with highest and best treatment.

**DEQ Findings:**

Based upon IPC’s proposed actions, operations, and activities in its 401 Application, as supplemented, including without limitation IPC’s proposed alternative measures and obligations set forth in the Settlement Agreement, DEQ is reasonably assured that Project operation under a new FERC license will comply with the statewide narrative criteria and biocriteria, and sufficiently protect beneficial uses, provided the following measures are implemented:

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<sup>14</sup> a thin, slimy film of bacteria that adheres to a surface of rock substrate in aquatic systems

- Measure variation in river stage at the Snake River at Hells Canyon Dam gauging station 13290450 (RM 247) or at any other gauging station located within five miles downstream of Hells Canyon dam and report these measurements to DEQ on a monthly and annual basis.
- Develop a macroinvertebrate and periphyton monitoring plan for the Snake River below Hells Canyon Dam, which will include standard bioassessment metrics including densities, abundance, richness and tolerance as well as identify monitoring locations;
- Develop an alternative measures plan if the monitoring indicates continued impairment to the macroinvertebrate and periphyton community below Hells Canyon dam;
- Implement the Summer Entrapment Pool Survey Plan;
- Implement section 2.1 of the Juvenile Fall Chinook Salmon Entrapment Management Plan; and
- Maintain minimum flows as described in Exhibit A of the water quality certification.

## 7.2.2 Dissolved Oxygen:

### Definitions

#### OAR 340-041-0002

(27) "Intergavel Dissolved Oxygen" (IGDO) means the concentration of oxygen measured in the water within the stream bed gravels. Measurements should be taken within a limited time period before emergence of fry.

(39) "Monthly (30-day) Mean Minimum" for dissolved oxygen means the minimum of the 30 consecutive-day floating averages of the calculated daily mean dissolved oxygen concentration.

(74) "Weekly (seven-day) Minimum Mean" for dissolved oxygen means the minimum of the seven consecutive-day floating average of the daily minimum concentration. For application of the criteria, this value is the reference for diurnal minimums.

#### OAR 340-041-0016

#### Dissolved Oxygen

(1) For water bodies identified as active spawning areas in the places and times indicated on the following Tables and Figures set out in OAR 340-041-0101 to 340-041-0340: Tables 101B, 121B, and 190B, and Figures 130B, 151B, 160B, 170B, 180A, 201A, 220B, 230B, 260A, 271B, 286B, 300B, 310B, 320B, and 340B, (as well as any active spawning area used by resident trout species), the following criteria apply during the applicable spawning through fry emergence periods set forth in the tables and figures and, where resident trout spawning occurs, during the time trout spawning through fry emergence occurs:

- (a) The dissolved oxygen may not be less than 11.0 mg/l. However, if the minimum intergavel dissolved oxygen, measured as a spatial median, is 8.0 mg/l or greater, then the DO criterion is 9.0 mg/l;
- (b) Where conditions of barometric pressure, altitude, and temperature preclude attainment of the 11.0 mg/l or 9.0 mg/l criteria, dissolved oxygen levels must not be less than 95 percent of saturation;
- (c) The spatial median intergavel dissolved oxygen concentration must not fall below 8.0 mg/l.

(3) For water bodies identified by the Department as providing cool-water aquatic life, the dissolved oxygen may not be less than 6.5 mg/l as an absolute minimum. At the discretion of the Department, when the Department determines that adequate information exists, the dissolved oxygen may not fall below 6.5 mg/l as a 30-day mean minimum, 5.0 mg/l as a seven-day minimum mean, and may not fall below 4.0 mg/l as an absolute minimum (Table 21);

Dissolved oxygen is one of the principal parameters used to determine water quality sufficient to support aquatic life. Maintaining adequate concentrations of dissolved oxygen is vital to the support of fish,

invertebrates, and other aquatic life. Some aquatic species such as salmonids are sensitive to reduced dissolved oxygen concentrations. Sensitivity also varies between various life stages (e.g., incubation, emergence, growth) and between different life processes (e.g., rearing and reproduction). During spawning, salmonids will construct redds from suitable gravels to shelter eggs during incubation. Proper intergravel dissolved oxygen is critical for egg and embryo development. However, factors such as gravel porosity, substrate embeddedness, and sediment oxygen demand may reduce intergravel dissolved oxygen (IGDO) relative to dissolved oxygen in the water column. For this reason, DEQ establishes a biologically-based numeric criterion for IGDO to ensure adequate oxygen available to salmonids during early life stage development.

### **Water Quality Trading**

In 2015, the Environmental Quality Commission adopted rules that establish the requirements for water quality trading in Oregon. These rules provide that DEQ may condition a 401 certification based on water quality trading consistent with Chapter 340, Division 39. IPC proposed to address the dissolved oxygen Snake River Hells Canyon TMDL load allocation by implementing the Riverside Operational Water-Quality Improvement Project (ROWQIP). IPC provided Exhibit 7.2-3 to demonstrate that the ROWQIP is consistent with OAR trading rules. The ROWQIP qualifies as a trading plan pursuant to OAR 340-039-0025, and DEQ finds that this trading plan demonstrates compliance with applicable dissolved oxygen criteria.

The elements of a Trading Plan include: the parameter for which the trading plan is developed; the trading baseline; trading area, a description of best management practices to be implemented; trading ratios; credits; monitoring; performance verification; tracking and reporting and adaptive management. Each required element is described in detail and the ROWQIP is evaluated against the required elements in the following paragraphs.

**Parameter:** The ROWQIP focuses on phosphorus reductions, measured in pounds of phosphorus per day.

**Trading Baseline:** OAR 340-039-0005(6) defines the trading baseline as “Pollutant load reductions, BMP requirements, or site conditions that must be met under regulatory requirements in place at the time of trading project initiation.” The trading baseline describes requirements that are separate from requirements included as part of a trading plan. The trading baseline must account for regulatory requirements applicable to the trading project at the time of trading project initiation. The regulatory requirements include: NPDES permit requirements; Oregon Department of Agriculture rules issued for an agricultural water quality management area; Oregon Board of Forestry rules; requirements of a federal management plan; requirements under a section 401 certification; local ordinances, tribal laws; other nonpoint source requirements; permits required under section 404 of the Clean Water Act; and regulatory requirements a designated management agency establishes to comply with a DEQ-issued TMDL or water quality management plan. As noted above, the phosphorus reductions are due to changes in operations at the Riverside Irrigation District. Currently, there are no regulatory requirements that Riverside Irrigation District change its canal operations or reduce phosphorus loads.

**Trading area:** OAR 340-039-0005(5) defines a trading area as “A watershed or other hydrologically-connected geographic area, as defined within a water quality management plan adopted for a TMDL, trading framework or trading plan. A trading area must encompass the location of the discharge to be offset, or its downstream point of impact, if applicable, and the trading project to be implemented.” The SR-HC TMDL defined the contribution of Brownlee Reservoir to degraded dissolved oxygen conditions within the reservoir, and assigned a specific dissolved oxygen load allocation to IPC. A dissolved oxygen load allocation of 1,125 tons was established for Brownlee Reservoir. Riverside Irrigation District operates the Riverside Canal, located at the western end of the Boise River valley near the confluence of the Boise and Snake rivers. The ROWQIP will be implemented in the Riverside Irrigation District and



will redirect irrigation return flows to be re-used on agricultural fields instead of directly returning them to the Snake and Boise rivers. The ROWQIP is intended to address dissolved oxygen conditions in Brownlee Reservoir. The Riverside Irrigation District and the project location are both visible in the map in Figure 6 (Idaho Power Company, 2018)(Page 215).

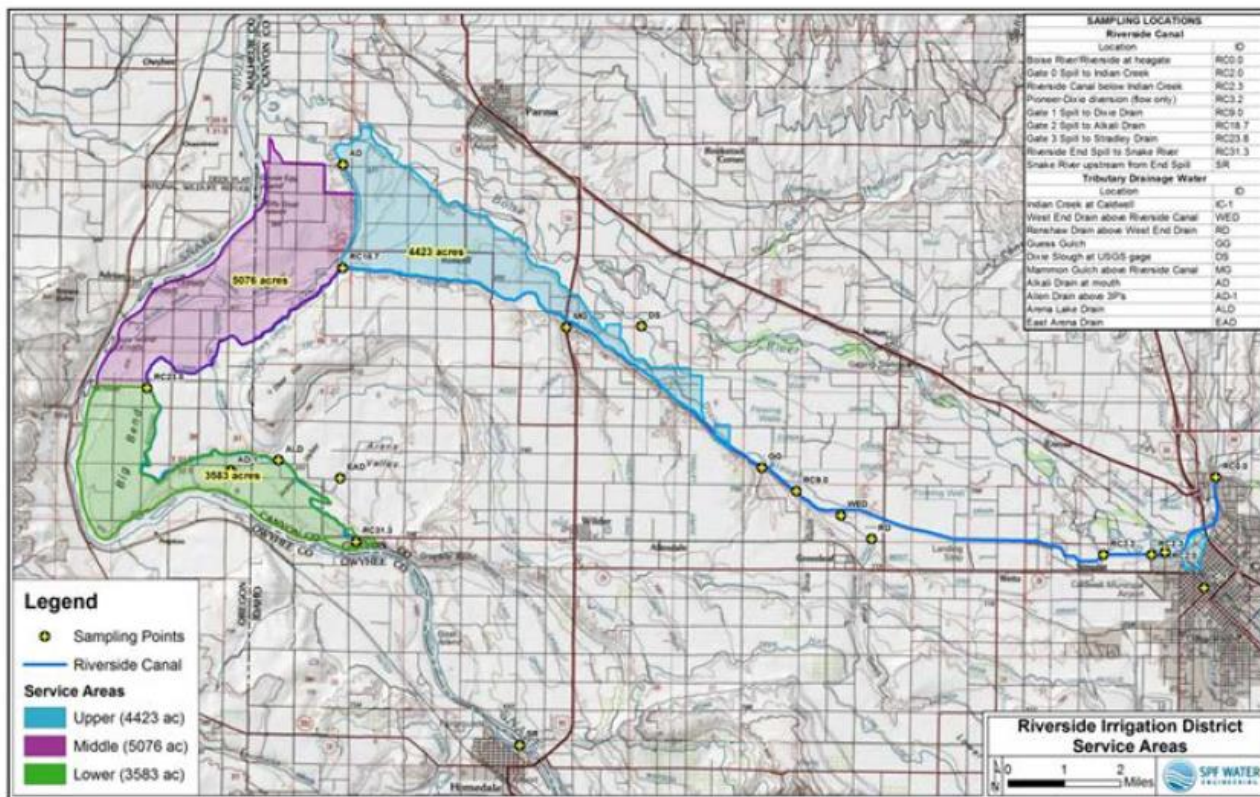


Figure 6: Riverside Irrigation District

Best management practices: OAR 340-039-0005(1) defines best management practices as: In-water or land-based conservation, enhancement or restoration actions that will reduce pollutant loading or create other water quality benefits. BMPs include, but are not limited to, structural and nonstructural controls and practices and flow augmentation. The ROWQIP uses the automated operation of the irrigation canal delivery system in order to reduce phosphorus loading the Boise and Snake rivers. Automation minimizes the withdrawal of higher quality water and maximizes the reuse of lower quality water. The improved canal management is the BMP that will be used to generate those reductions. The detailed project design and operation information described in Exhibit 7.2-2 of the June 14, 2018 application for section 401 certification, serve as the quality standards for the project.

Trading ratios: OAR 340-039-0005(10) defines a trading ratio as “A numeric value used to adjust the number of credits generated from a trading project, or to adjust the number of credits that a credit user needs to obtain.” The trading plan rules (OAR 340-039-0025(5)(e)) require: a description of applicable trading ratios, the basis for each applicable trading ratio, including underlying assumptions for the ratio, and a statement indicating whether those ratios increase or decrease the size of a credit obligation or the number of credits generated from an individual trading project. The trading ratios must account for variables such as attenuation of the water quality benefit or uncertainty of BMP performance or water quality benefit measurement or estimate. The ROWQIP practices result in a decreased phosphorus load to

the Boise and Snake Rivers. Because the load is reduced at the source, there will be no attenuation of the benefit instream. No trading ratios are explicitly identified for the ROWQIP; however the project includes an equivalency ratio. The equivalency ratio identifies the phosphorus reduction that is needed to achieve the dissolved oxygen allocation. While no trading ratio was set for the ROWQIP, the Snake River - Hells Canyon TMDL set a 13% margin of safety for phosphorus load allocations.

Credits: OAR 340-039-0005(3) describes a credit as “A measured or estimated unit of trade for a specific pollutant that represents the water quality benefit a water quality trading project generates at a location over a specified period of time, above baseline requirements and after applying trade ratios or any other adjustments.” The trading plan must include a description of the credits, including the number of credits needed and a schedule for credit generation, a description of how the credits will be quantified and how long the credits will be used. As noted above, the ROWQIP needs to generate 15,000 lbs P to be equivalent to the dissolved oxygen allocation of 1,125 tons. The calculations used to generate the credits are described in detail in Exhibit 7.2-2 of the June 14, 2018 application for section 401 certification. The period of credit generation (duration) is 183 days beginning April 15 and extending to October 15. This period covers the irrigation season.

Monitoring: OAR 340-039-0025(5)(g) notes that the trading plan must include a description of the proposed methods and frequency of trading project BMP monitoring; and the proposed methods and frequency of how water quality benefits generated by a trading project will be monitored. IPC plans to submit a monitoring and reporting plan to DEQ within 1 year of the new license issuance for the HCC. The monitoring plan will include details on methods and frequency for monitoring the canal operations and for the phosphorus reductions that the ROWQIP generates. The proposed section 401 conditions include a requirement that the monitoring plan be submitted to DEQ within 120 days of the federal license issuance. The monitoring plan will be subject to DEQ review and approval.

Performance verification: OAR 340-039-0025(5)(h) notes that the trading plan must include a “description of how the entity will verify and document for each trading project that BMPs are conforming to applicable quality standards and credits are generated as planned.” The ROWQIP will include third party verification and associated reporting. IPC will be required to submit an annual report to DEQ demonstrating whether the implementation of the ROWQIP attained the dissolved oxygen load allocation, expressed as a total phosphorus reduction, for that year.

Tracking and reporting: Under OAR 340-039-0025(5)(i) the trading plan must include a description of how credit generation, acquisition and usage will be tracked and how this information will be made available to the public. As noted above, IPC will submit an annual report to DEQ describing credit generation, and how those credits relate to the compliance target.

Adaptive management: As described in OAR 340-039-0025(6), trading plans must include a description of how monitoring and other information may be used over time to adjust trading projects and under what circumstances. IPC notes that operations and management of inflowing source water could substantially change in the future if the phosphorus levels substantially change in source water. As the project evolves, more effort will be focused on reducing agricultural runoff and additional water improvements that could be added to the load reductions produced through the ROWQIP. IPC will submit alternative measures to DEQ for review and approval.

**Current Water Quality Status and Applicable Criteria:**

As discussed earlier, the upstream segments of the Snake River are water quality limited for chlorophyll *a*, phosphorus and dissolved oxygen. The Snake River Hells Canyon TMDL set total phosphorus waste load allocations and load allocations for sources in the upstream Snake River segment and the tributaries equivalent to a concentration limit of 0.07 mg/l total phosphorus.

IPC notes that total phosphorus measured at the inflow to Brownlee Reservoir has been declining. IPC analyzed the data with the seasonal Mann-Kendall test for trend. The trend shows significant ( $p < 0.001$ ) decreasing trends in TP during the May – September period (Figure 7) (Idaho Power Company, 2018)(Page 86).

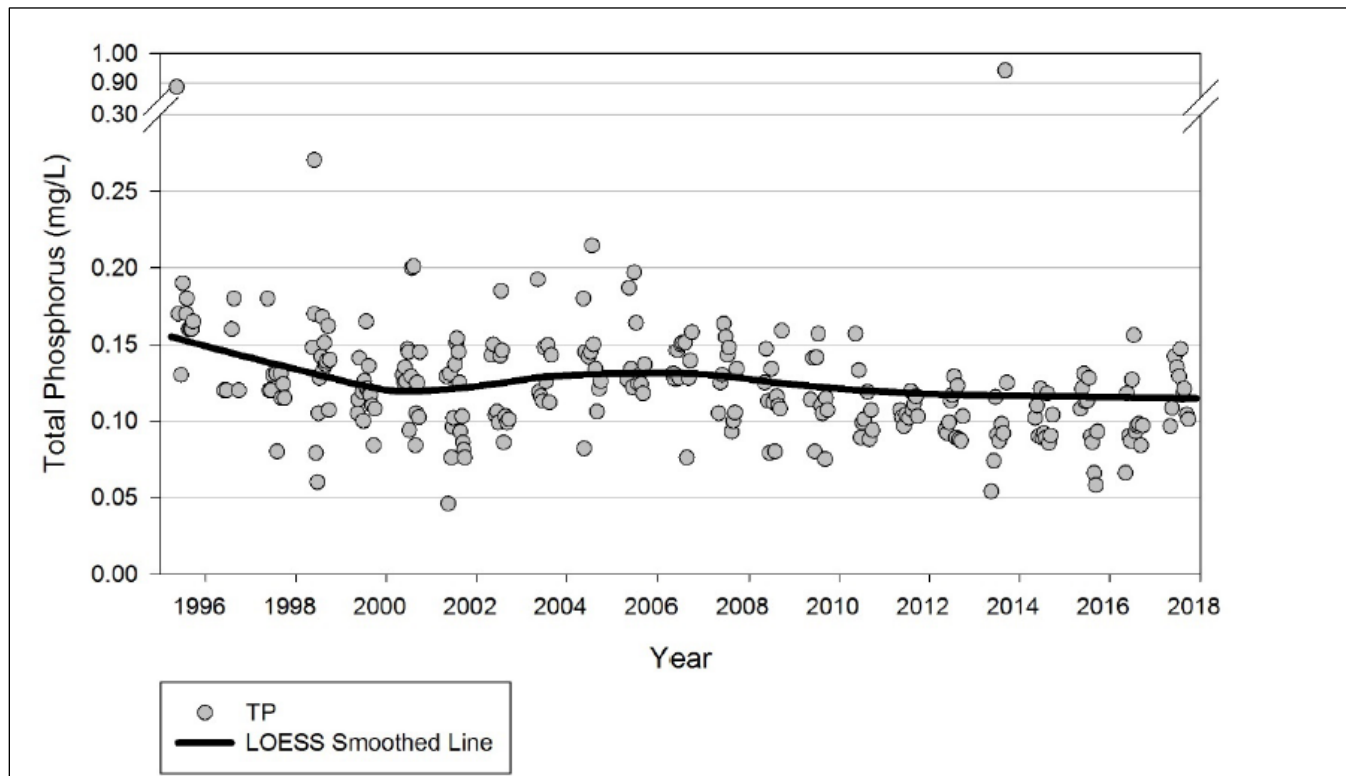


Figure 7: Measured Brownlee Reservoir inflow TP, May - Sept. 1995-2017

IPC also analyzed dissolved oxygen data collected July 1 through December 31, from 2004 through 2017. IPC notes, “During the cool-water aquatic life period there are statistically significant increasing trends in the 30-day mean minimum HCC outflow conditions” (Idaho Power Company, 2018)(Page 91). IPC notes that there is no statistically significant increasing trend during the salmonid spawning period.

The applicable dissolved oxygen criteria vary with the designated fish uses. The fish uses in the Snake River are identified in Table 2, and Figures 2 - 4 of this evaluation report. Relevant sections of the applicable Oregon water quality standards for dissolved oxygen are as follows:

**Redband or Lahontan Cutthroat Trout Cool Water Dissolved Oxygen Criterion**

The Snake River from Hells Canyon Dam to Idaho border (approximate river miles 247.5 to 409) is designated for Redband or Lahontan Cutthroat Trout. Oregon’s water quality standards do not specify the applicable dissolved oxygen criteria for Redband or Lahontan Cutthroat trout. DEQ determined which dissolved oxygen criteria to apply to redband or Lahontan cutthroat trout designated uses. DEQ uses an ecoregion map, published in 2003, and determines the use of the cool water dissolved oxygen criteria or cold water aquatic life criteria, based on ecoregion location of the waterbody of interest. Using the ecoregion map, the Snake River through Brownlee Reservoir, Oxbow and Hells Canyon Reservoirs is in the “cool water” location. The cool water criterion is described in OAR 340-041-0016 (3) as “may not be less than 6.5 mg/l as an absolute minimum.” Based on this analysis DEQ will apply the cool water

criterion of 6.5 mg/L dissolved oxygen to the Snake River from Brownlee Reservoir, through Oxbow Reservoir and through Hells Canyon reservoir.

Currently, dissolved oxygen levels in Brownlee Reservoir do not always meet the 6.5 mg/L criterion. Dissolved oxygen in Brownlee Reservoir can become severely degraded, especially during the summer (Figure 8). These data were collected in average (1995), high (1997), and low (2002) water year.

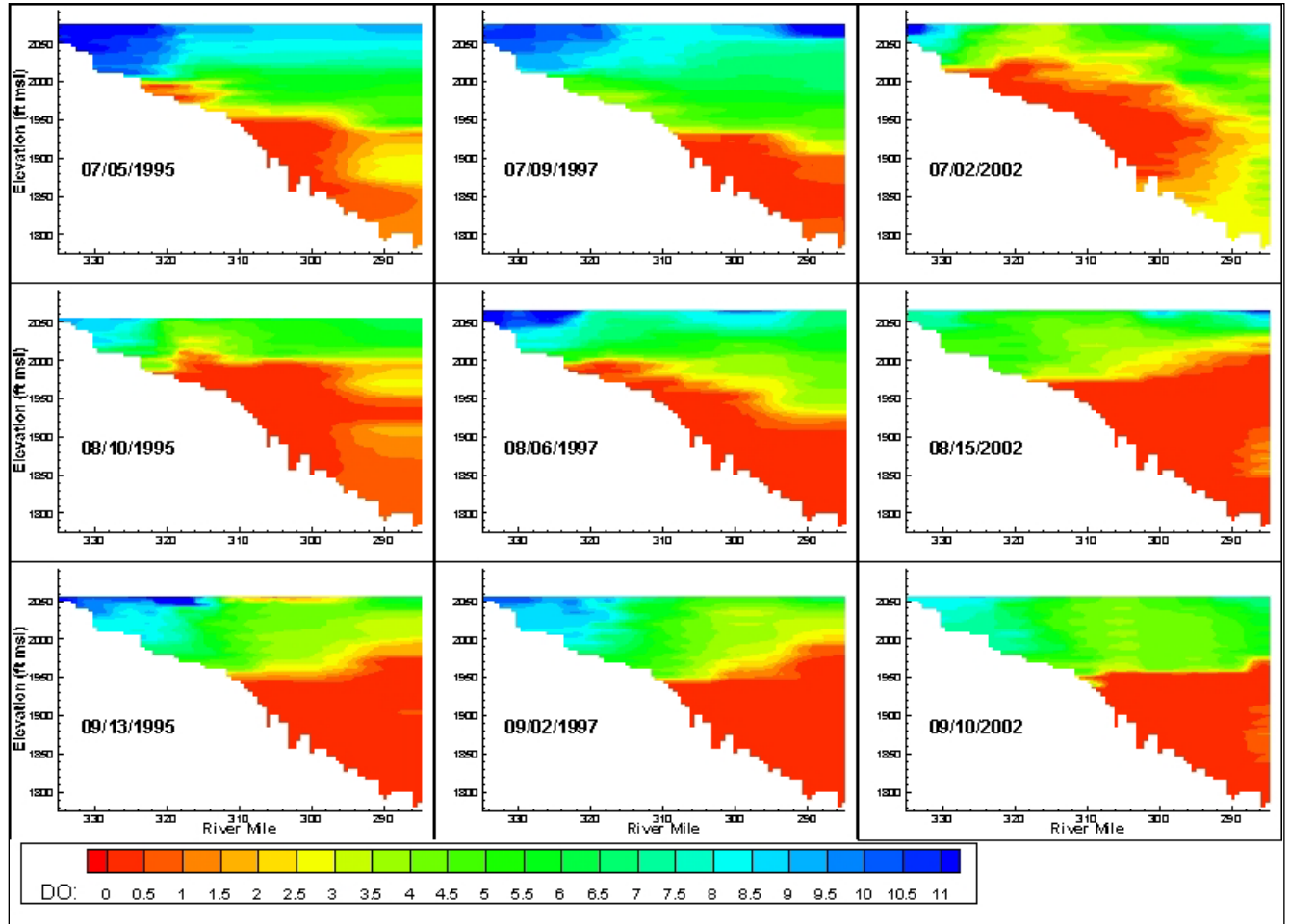


Figure 8: Brownlee Reservoir Dissolved Oxygen (IPC June 2018 application, Figure 6.2-9)

As seen in Figure 9, outflow dissolved oxygen from Brownlee is typically below applicable criteria beginning in July and going into December. The period of record for Figure 9 is 2004 through 2017, with measurements taken about every ten minutes. IPC notes, “DO levels can vary considerably throughout the day in the Brownlee outflow (e.g., 2 to 4 mg/L). In contrast to the daily inflow DO pattern, daily changes in Brownlee outflow DO are related primarily to operations of the Brownlee Powerhouse.” (Idaho Power Company, 2018)(Page 86).

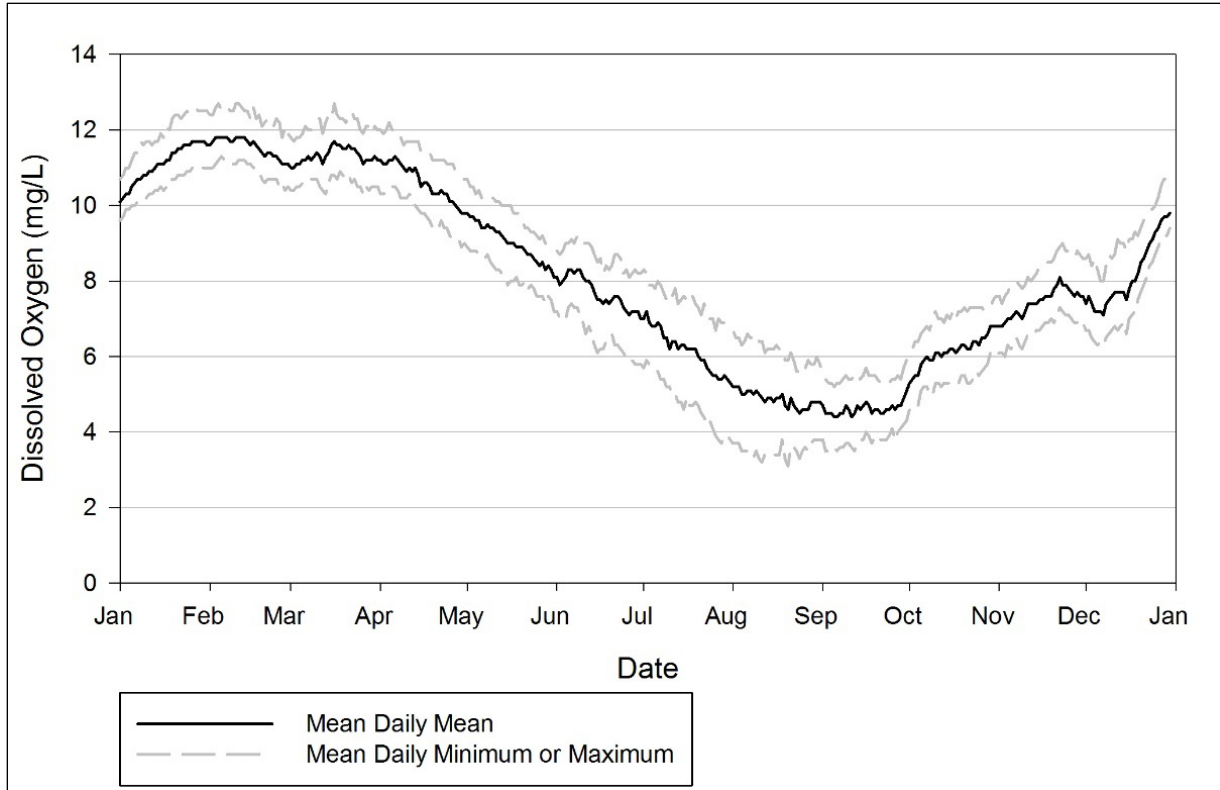


Figure 9: Brownlee Reservoir outflow dissolved oxygen (IPC June 2018 application, Figure 6.2-11)



Hell Canyon outflow dissolved oxygen data indicates that the 6.5 mg/L is often not met (Figure 10). The period of record for Figure 10 is 2004 through 2017, with measurements taken about every ten minutes.

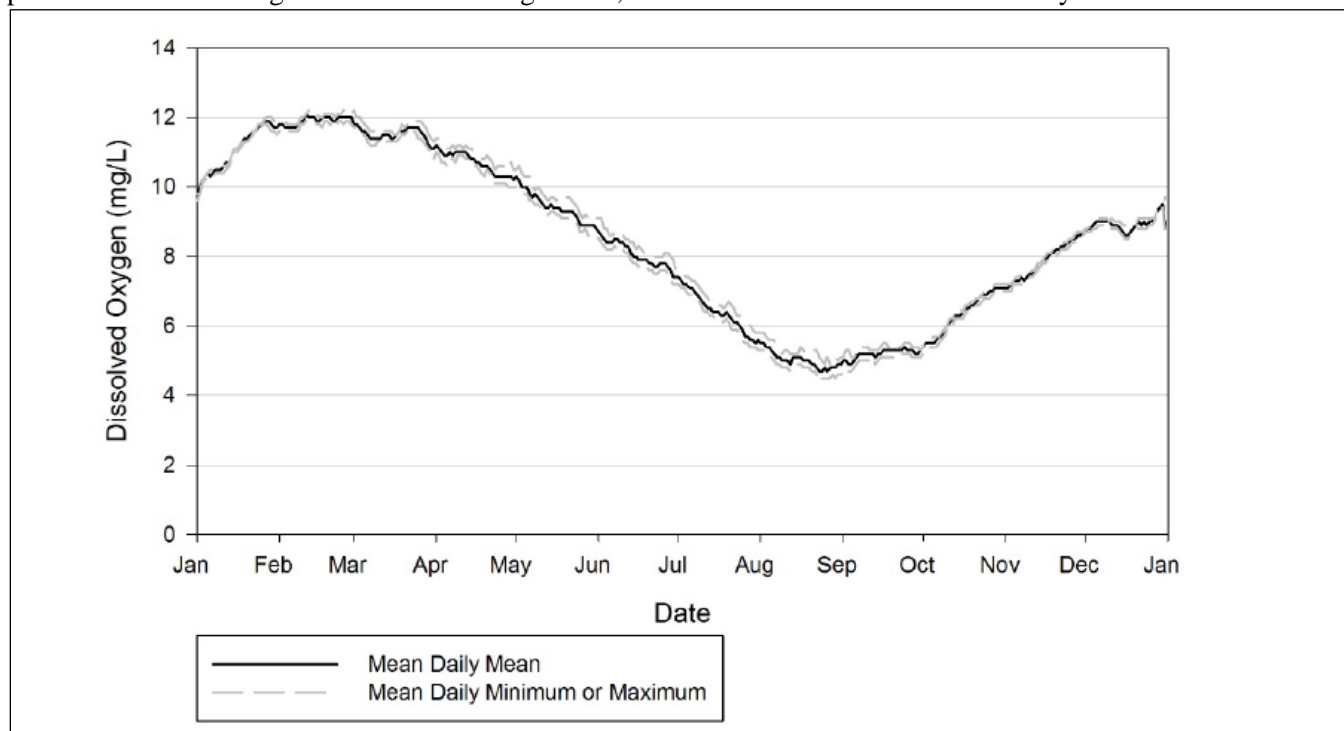


Figure 10: Hells Canyon outflow dissolved oxygen, 2004 -2017 (IPC June 2018 application, Figure 6.2-12)

### Salmon and Steelhead Spawning through Fry Emergence 11 mg/L Dissolved Oxygen Criterion

The Snake River from Hells Canyon Dam outflow to OR/WA border (approximate river miles 247.6 to 169) is designated for Salmon and Steelhead Migration Corridors and Salmon and Steelhead Spawning through Fry Emergence. In previous correspondence between EPA and DEQ (2004 implementation memo from DEQ to EPA) DEQ said the dissolved oxygen spawning criterion would apply from Jan. 1 to May 15 to protect resident trout spawning throughout their range. According to a timing table developed by ODFW in 2003, there is no resident trout spawning in the Snake River below Hells Canyon dam to the WA/OR border, so the dissolved oxygen spawning criteria is not for resident trout spawning. However, the Snake River is designated for salmon and steelhead spawning from Hells Canyon Dam to the confluence with the Salmon River from October 23 to April 15 and from the Salmon River to the OR/WA border from November 1 through May 15.

The applicable dissolved oxygen criteria for water bodies identified as active spawning areas is described in OAR 340-041-0016(1)(a) – (c) and the “dissolved oxygen may not be less than 11.0 mg/l.” However, if the minimum intergravel dissolved oxygen, measured as a spatial median, is 8.0 mg/l or greater, then the dissolved oxygen criterion is 9.0 mg/l. In the June 2018 application for section 401 certification, IPC presented an analysis of intergravel dissolved oxygen data to support application of water column target less than 11 mg/L. IPC proposes that the water-column criteria of 11 mg/L is designed to attain intergravel levels of 8 mg/L. As stated by IPC “Therefore, the water-column criterion of 11 mg/L assumes a differential (i.e., water-column DO minus intergravel DO) of 3 mg/L.” (Idaho Power Company, 2018)(Page 68). IPC collected water-column and intergravel dissolved oxygen data for the Snake River below the Hells Canyon Complex to determine a water-column dissolved oxygen level that would result in meeting the intergravel criterion of 8 mg/L based on measured differentials. The analysis consisted of the following steps:

- IPC collected dissolved oxygen measurements in the water column, artificial redds and ambient hyporheic zone about every 2 weeks, throughout the 2003/2004 and 2004/2005 spawning seasons.
- A dissolved oxygen differential was calculated for each sample event by subtracting the intergravel dissolved oxygen (from each artificial redd) from the water-column dissolved oxygen (measured at the same time at each site). The summarized differentials from the artificial redds above the Salmon River confluence were generally less than 3 mg/L.
- The median differential of each site (i.e., a cluster of 3 artificial redds) was calculated.
- Table 26 summarizes site median dissolved differentials in mg/L between intergravel dissolved oxygen measured in artificially constructed redds and dissolved oxygen in the water column for sites on the Snake River below Hells Canyon dam and above the Salmon River confluence. The 90th percentile of these median differentials was selected as a level appropriate to apply in determining a water-column target.
- The differential was added to 8 mg/L to determine the water column target.
- The first five sample dates represent 10 weeks into the spawning period (October 23–January 1), after which measured data below the Hells Canyon Complex show criteria are met.
- The resulting water-column target ranged from 9.1 mg/L on October 23 to 9.6 mg/L through the end of the season (Table 27).

**Table 26: Median dissolved oxygen differentials (IPC application, Table 6.2-3)**

Upper Hells Canyon	First Date	Second Date	Third Date	Fourth Date	Fifth Date
Minimum	0.2	0.2	0.2	0.3	0.5
10th percentile	0.2	0.3	0.2	0.6	0.6
25th percentile	0.3	0.4	0.4	0.8	0.7
Median	0.5	0.6	0.9	0.9	0.9
75th percentile	0.6	0.8	1.2	1.1	1.5
90th percentile	1.1	1.5	1.7	1.5	1.6
Maximum	1.7	1.5	1.7	1.5	1.7
Number of Samples	9	9	9	9	9

**Table 27: Water Column dissolved oxygen targets during salmonid spawning period**

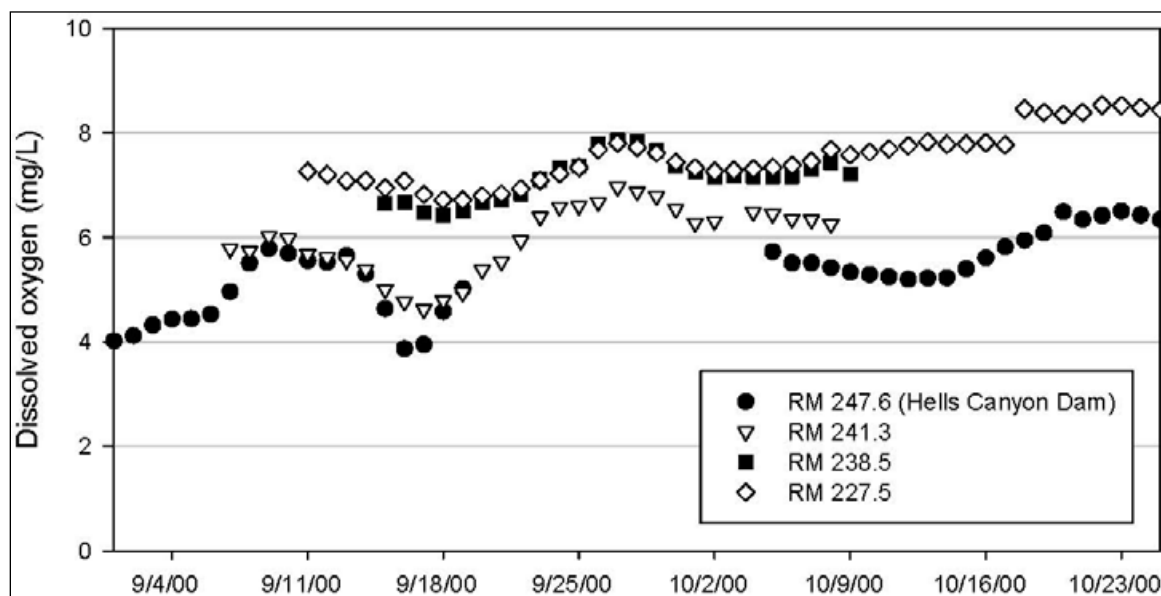
	First Date (10/23)	Second Date (11/7)	Third Date (11/22)	Fourth Date (12/7)	Fifth Date (12/21–4/15)
Resulting water-column DO target (mg/L)	9.1	9.5	9.7	9.5	9.6

In the June 2018 section 401 application, IPC applies the resulting water column targets for dissolved oxygen to the Snake River below the Hells Canyon dam from October 23 through April 15.

### **Salmon and Steelhead Migration Corridors 6.5 mg/L Dissolved Oxygen Criterion**

The applicable dissolved oxygen criteria for the Salmon and Steelhead migration corridor beneficial use is not included in Oregon’s water quality standards. The Salmon and Steelhead migration corridor fish use designation was not addressed in any memos from DEQ to EPA. However, on the ecoregion map, the Snake River below Hells Canyon dam is in the “cool water” location. The ecoregion map supports the use of the cool water criterion of 6.5 mg/L dissolved oxygen to the Snake River below Hells Canyon dam, to the Oregon/Washington border, during non-spawning periods.

Hells Canyon outflow is typically near 4 mg/L in September, which is 2.5 mg/L below the 6.5 mg/L criteria (Figure 10). As seen in Figure 11, the dissolved oxygen can increase downstream of Hells Canyon dam. IPC notes, “Even further downstream through several large rapids reaeration can be 1 to 2 mg/L 10 miles downstream.” (Idaho Power Company, 2018) (Page 93).



**Figure 11: Daily average dissolved oxygen below Hells Canyon dam and the Snake River below Hells Canyon Dam. (IPC June 2018 application, Figure 6.2-18)**

### Oxbow Bypass Dissolved Oxygen

The Oxbow Bypass is a short, 2.5-mile section of the Snake River below Oxbow Dam. The bypass extends from Oxbow Dam (RM 272.5) downstream to the powerhouse (RM 270). IPC maintains a minimum flow of 100 cubic feet per second through the bypass. A deep-water pool exists approximately 1.2 miles downstream of Oxbow Dam. The pool is approximately 50 feet deep and roughly 2 acres in surface area. IPC notes that the 100-cfs flow rate is not enough to completely mix this deep pool and, at times, the pool thermally stratifies during the summer (Myers, 2003), as referenced in (Idaho Power Company, 2018)(Page 95). The thermal stratification results in the deeper, cooler water becoming anoxic during some parts of the summer season.

### Applicant's Proposed Measures

#### Distributed Aeration Systems at Brownlee Powerhouse

As noted earlier, the applicable dissolved oxygen criteria are not consistently met below Hells Canyon Complex. The Snake River –Hells Canyon TMDL did not develop dissolved oxygen targets or allocations based on the protection of salmonid spawning downstream of Hells Canyon Complex. To simulate improvements in Hells Canyon Complex outflow dissolved oxygen following full Snake River Hells Canyon TMDL implementation, IPC used the CE-QUAL-W2 model. The steps involved in this analysis are summarized below (Idaho Power Company, 2018)(Page 99):

- Reduce inflowing nutrients and organic matter at the Brownlee Reservoir boundary conditions (RM 340) to meet the SR–HC TMDL TP target of 0.07 mg/L.
- Increase inflow DO at the Brownlee Reservoir upper boundary conditions to meet the SR–HC TMDL DO target of 6.5 mg/L.
- Set the SOD at long-term levels of 0.1 g of oxygen per m<sup>2</sup> per day throughout Brownlee Reservoir.



- Use outflow from the upstream reservoir as the inflow boundary condition to the downstream reservoir (referred to as linked simulations) and set the SOD to 0.1 g of oxygen per m<sup>2</sup> per day.

IPC notes “Full implementation of the Snake River TMDL allocations show average annual improvements of 3.2 and 2.5 mg/L during the cool water aquatic life and salmonid spawning period, respectively” (Idaho Power Company, 2018)(Page 99)(Figure 12).

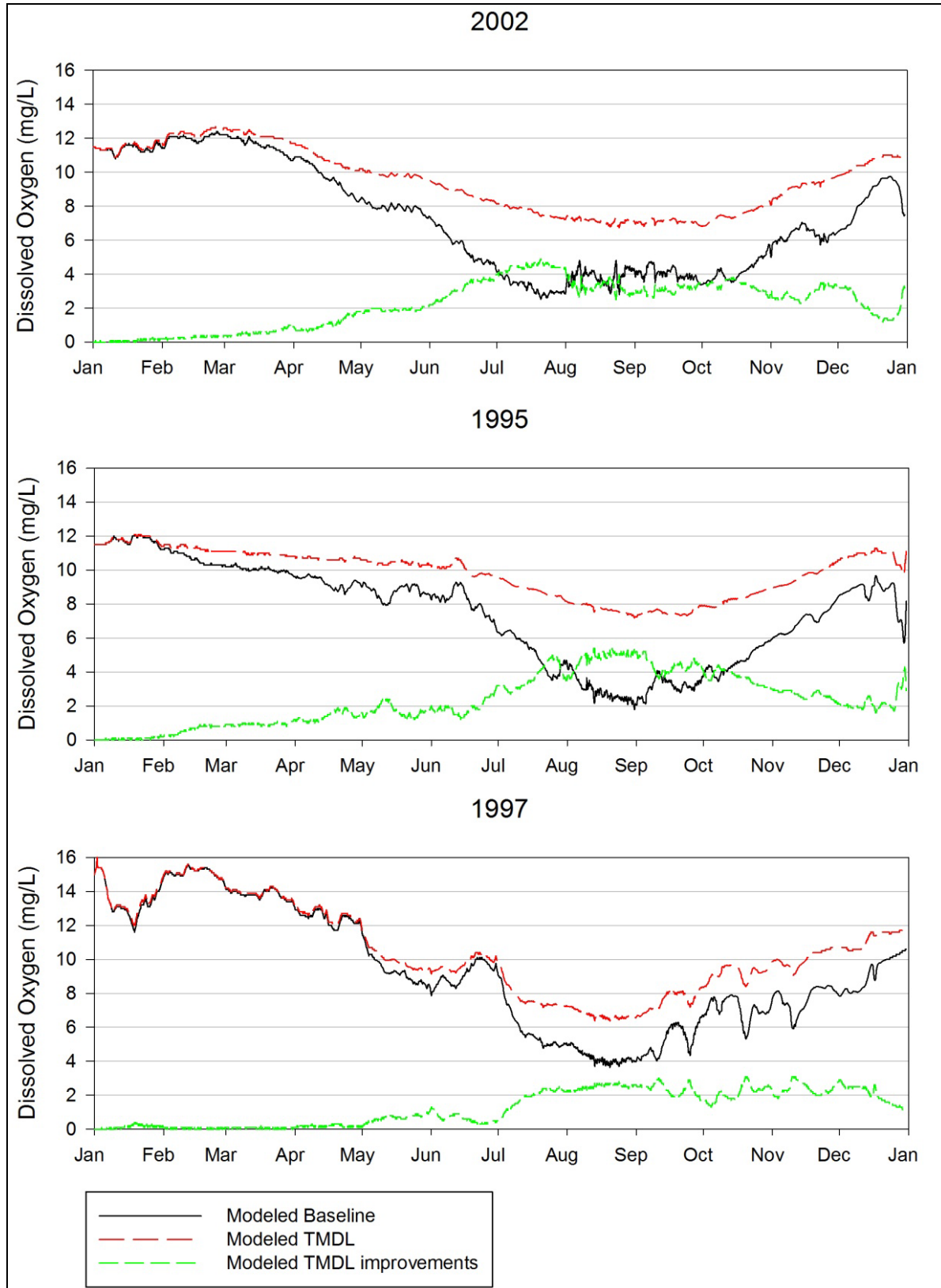


Figure 12: Modeled Dissolved Oxygen Improvements. (IPC June 2018 Application, Figure 6.2-20)

The Snake River Hells Canyon TMDL notes “Generally, TMDL processes are expected to be completed within ten to 15 years of approval, this system, with its sequential tributary TMDL processes, wide diversity of land use and staggering size will no doubt require several decades to respond completely to implementation projects and changes in management” (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(Page ff). Because of the expected long implementation timeline for the Snake River Hells Canyon nutrient TMDL, the water quality flowing into Brownlee Reservoir does not currently attain the model boundary conditions. DEQ requested that IPC provide additional information about the dissolved oxygen deficit before full implementation of the Snake River Hells Canyon nutrient TMDL. In response to this request, IPC calculated the average annual dissolved oxygen deficit from criteria at the Hells Canyon Complex outflow from years 2004-2017. IPC completed the following steps to quantify the annual average DO deficit from criteria at the HCC outflow:

- Using dissolved oxygen at the Hells Canyon Complex outflow for the period of July 1 through October 22, from 2004 through 2017, calculate the dissolved oxygen deficit by comparing measured data to the 6.5 mg/L cool water aquatic life DO criteria.
- Using dissolved oxygen at the Hells Canyon Complex outflow for the period of October 23 through December 31, from 2004 through 2017, IPC calculated the DO deficit by comparing measured data to the water column values calculated from IGDO values.
- The 30-day or 7-day (depending on the period of interest) floating mean of the daily mean dissolved oxygen concentration was calculated for every day and subtracted from the criteria to calculate the deficit. The daily deficits (only for the days where dissolved oxygen was below criteria) were then averaged over the periods (cool water, salmonid spawning and annually) to calculate average dissolved oxygen deficit.

Table 28 summarizes the results of these analyses:

**Table 28: Average Hells Canyon Complex Dissolved Oxygen Deficit**

	<b>Cool-water life average DO deficit from criteria (mg/L)</b>	<b>Salmonid Spawning average DO deficit from criteria (mg/L)</b>	<b>Annual Average DO deficit from criteria (mg/L)</b>
<b>2004</b>	1.8	2.4	2.1
<b>2005</b>	2.1	1.2	1.7
<b>2006</b>	1.9	1.8	1.9
<b>2007</b>	1.6	1.4	1.5
<b>2008</b>	1.4	1.8	1.6
<b>2009</b>	1.9	1.7	1.8
<b>2010</b>	0.6	1.6	1.0
<b>2011</b>	0.6	1.6	1.1
<b>2012</b>	0.8	1.5	1.1
<b>2013</b>	1.0	1.0	1.0
<b>2014</b>	0.7	1.4	1.0
<b>2015</b>	0.7	1.3	1.0
<b>2016</b>	0.3	1.2	0.8
<b>2017</b>	1.3	1.4	1.3
<b>Average 2004-2017</b>	1.2	1.5	1.4
<b>Average 2010 - 2017</b>	0.8	1.4	1.0

IPC notes that the annual average deficits are representative of dissolved oxygen at the Hells Canyon powerhouse before the water passes through the turbines since IPC collects measurements from the turbine water intake system. These measurements do not include any aeration through the turbines from

the addition of air for operational purposes or in the turbulent river downstream of Hells Canyon dam. IPC compared measurements from the turbine water intake system and at the Hells Canyon boat launch about 0.7 miles downstream. IPC notes, “This comparison shows that, during the cool-water aquatic life period, reaeration averaging 0.4 mg/L is occurring through the turbines and the first 0.7 miles of river downstream. During the salmonid spawning period when DO levels are higher to begin with there is less reaeration occurring with a difference between the medians of 0.2 mg/L” (Idaho Power Company, 2018)(Page 93).

IPC proposes a dissolved oxygen supplement goal of 0.4 and 1.2 mg/L during the cool-water aquatic life and salmonid spawning period, respectively. IPC based the supplementation goals on the difference between the 2010 – 2017 annual average deficit and the aeration from the turbines and the river. IPC notes, “This level of aeration offsets the current downstream DO deficits, incorporates reaeration that is occurring immediately downstream of HCD, addresses the uncertainty in the time frame for full upstream SR HC TMDL implementation and provides assurance that downstream standards will be met in the future (Idaho Power Company, 2018)(Page 224). IPC notes that this level of aeration is likely to stay within the limitations of the total dissolved gas criterion.

To address dissolved oxygen deficits both pre and post full implementation of the Snake River Hells Canyon nutrient TMDL, IPC proposes upgrading 4 of the 5 turbines (i.e., units 1 through 4) at the Brownlee Powerhouse with distributed aeration systems. IPC proposes to aerate when the incoming dissolved oxygen level to Brownlee Powerhouse is less than the applicable criteria.

Following the upgrade of Unit 1, IPC tested the performance of the aeration system for dissolved oxygen uptake and total dissolved gas increases. IPC noted “DO uptake ranged from 1.5 to 2.3 mg/L, averaging 1.9 mg/L, over both tests when the airflow valves were 100% open. TDG increased from 9 to 18% saturation, averaging 13.8% saturation increase (Idaho Power Company, 2018)(Page 225). IPC notes that the actual effects and limitations of the distributed aeration system cannot be definitive until IPC upgrades and tests all four turbines.

Because IPC’s aeration proposal includes aerating at units 1 through 4 and not unit 5, there are three aeration and mixing scenarios. IPC notes, “When units 1 through 4 (in any combination) are operating alone, additional oxygen would be added to the entire discharge. At times when all units are operating, the additional DO added to discharge from units 1 through 4 would be mixing with the non-aerated (i.e., no additional oxygen added) discharge from Unit 5. Finally, at times when only Unit 5 is operating, there would be no additional oxygen added to the discharge” (Idaho Power Company, 2018)(Page 227). Using data from operations in 2011- 2013 and aeration results testing, IPC estimated the potential overall annual average dissolved oxygen uptake that could result from the aeration proposal (Table 29) (Idaho Power Company, 2018)(Page 229).

Table 29: Range of estimated DO uptake and TDG increase at Brownlee Powerhouse

<b>Brownlee Powerhouse Unit Combinations</b>	<b>Fraction of Time Operating</b>	<b>Estimated DO Uptake (mg/L)</b>	<b>Estimated TDG Increase (% Saturation)</b>
<b>Cool-water aquatic life</b>			
Unit 5 only	0.09 – 0.20	0.0	0.0
Units 1–4 only	0.08 – 0.46	1.9	13.8
All Units	0.32 – 0.83	0.70 – 0.90	5.2 – 6.3
<b>Annual Time Weighted Average</b>		<b>0.9 – 1.1</b>	<b>6.3 – 8.2</b>
<b>Salmonid spawning</b>			
Unit 5 only	0.13 – 0.21	0.0	0.0
Units 1–4 only	0.38 – 0.61	1.9	13.8
All Units	0.17 – 0.47	0.7	4.8 – 5.3
<b>Annual Time Weighted Average</b>		<b>1.1 – 1.4</b>	<b>7.7 – 9.9</b>

IPC proposes to work with IDEQ and ODEQ to develop a monitoring and adaptive management plan for the distributed aeration systems. IPC notes that the testing conducted to date provides reasonable assurance that the aeration systems will be capable of adding the dissolved oxygen of 0.4 mg/L and 1.2 mg/L during the cool water aquatic life and salmonid spawning period, respectively, at the Brownlee Powerhouse.

### **Riverside Operational Water Quality Improvement Project**

As noted in the Snake River –Hells Canyon TMDL, IDEQ considered the Snake River water quality limited from RM 409 to 272.5 for nutrients. Data analyzed for the TMDL showed excessive total phosphorus concentrations in the Snake River from river mile 409 to 335. Nuisance algae blooms occurred routinely in the Snake River upstream of Brownlee Reservoir as well as in the upstream sections of Brownlee Reservoir. The TMDL set a chlorophyll *a* target of less than 14 ug/L and total phosphorus target of 0.07 mg/L. These targets apply from May through September. As noted in the TMDL, “Attainment of these targets is projected to result in a reduction of roughly 50 percent in algal biomass (as measured by chlorophyll *a*) that in turn will result in improvement in dissolved oxygen concentrations in both the Snake River and Brownlee Reservoir. A load allocation for the addition of 1,125 tons of dissolved oxygen per season has been assigned to Idaho Power Company to offset reduction in assimilative capacity caused by the Hells Canyon Complex impoundments” (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(Page ii). As alternatives to addition of oxygen, both the TMDL and the §401 application (Idaho Power Company, 2018)(Page 215) provide phosphorus and organic matter equivalents to the required amount of oxygen.

IPC is proposing to address the dissolved oxygen load allocation by implementing the Riverside Operational Water-Quality Improvement Project (ROWQIP). Under current operations, Riverside Irrigation District preferentially uses water with relatively high phosphorus levels to irrigate, rather than spilling it into the Boise or Snake River. IPC notes the “reduced phosphorus loading to the rivers will result in corresponding reductions in phosphorus and organic matter loading to Brownlee Reservoir. IPC is proposing to use the reduction in oxygen demand in Brownlee Reservoir, resulting from the reduction

of phosphorus and organic matter loading to Brownlee Reservoir, to meet its DO load allocation defined in the SR-HC TMDL” (Idaho Power Company, 2018)(Page 214). .

### **Grand View Sediment Reduction Program**

IPC proposes the Grand View Sediment Reduction Program, which is a voluntary incentive program IPC offers to growers near Grand View, Idaho, to convert from furrow to pressurized irrigation. The goal is to reduce upland soil loss and, therefore, sediment and phosphorus delivery to the Snake River. IPC calculated the annual total phosphorus load reduction as follows:

1. IPC used the Surface Irrigation Soil Loss (SISL) model to estimate irrigation induced soil loss.
2. IPC compared measured data collected in 2013 from drains and tributaries in the program area to estimates of irrigation induced soil loss using the SISL model and validated the use of the SISL model for estimating load reductions from the Grand View Sediment Reduction Program.
3. The SISL model estimated a sediment reduction of 21,474,000 pounds per year based on a 183-day irrigation season.
4. Discounting the sediment reduction to 90% results in an annual sediment load reduction of 15,461,280 pounds per year.
5. Using a total phosphorus and total suspended solids regression analysis for the drains and tributaries, IPC calculated 1.56 pounds total phosphorus to each ton total suspended solids ratio, assuming that TSS and sediment are analogous.
6. IPC applied the 1.56 pounds total phosphorus: 1-ton TSS ratio to the SISL model sediment reduction estimate of 15,461,280 pounds per year for the Grand View Sediment Reduction Program. The potential annual total phosphorus load reduction is 12,060 pounds per year.
7. Based on phosphorus processing in the Snake River, and stoichiometry, the annual total phosphorus load reduction is equivalent to 905 tons per year dissolved oxygen demand reduction (Idaho Power Company, 2018)(Page 221).

### **Swan Falls Project Aquatic Vegetation and Debris Removal**

Under the 2012 FERC license for the Swan Falls hydroelectric project, IPC removes aquatic vegetation and debris that accumulates on the trash rake and disposes of the material in a location where it cannot return to the Snake River. IPC has removed 56 – 417 truckloads of material annually from the Snake River. IPC converted this mass to total phosphorus using a value of 489.2 milligrams total phosphorus per kilogram of wet weight. IPC based this value on 2002-2003 laboratory results of total phosphorus concentrations measured in wet material collected upstream at IPC’s Upper Salmon Falls “B” hydroelectric project. IPC estimates removal of 1,547 pounds total phosphorus annually from the Snake River through aquatic vegetation and debris removal at the Swan Falls project.

### **DEQ Evaluation**

#### **Distributed Aeration Systems at Brownlee Powerhouse**

IPC proposes to add 0.4 mg/L and 1.2 mg/L of dissolved oxygen during the cool water aquatic life and salmonid spawning period, respectively, at the Brownlee Powerhouse. As seen in Table 28, the annual average dissolved oxygen deficit is 1.2 mg/L and 1.5 mg/L, during the cool water aquatic life and salmonid spawning period, respectively, as measured from 2004- 2017. IPC proposes to target the deficit calculated from 2010 -2017 since data indicate improvements to Hells Canyon outflow dissolved oxygen data during the cool water aquatic life period. IPC notes that the annual average deficits are representative of dissolved oxygen at the Hells Canyon powerhouse before the water passes through the turbines since IPC collects measurements from the turbine water intake system.

DEQ notes that although data indicate improvement in outflow dissolved oxygen conditions, the improvements are only statistically significant during the cool water aquatic life period. During the salmonid spawning period, there was not a statistically significantly increasing trend in the 7-day mean minimum conditions. Additionally, the TMDL modeling results (Figure 12) indicate that following implementation of the nutrient TMDL, there will likely still be dissolved oxygen deficits during the early spawning period (approximately October – December). For these reasons, DEQ will use the longer period of record, 2004 -2017, to set the required supplementation of dissolved oxygen.

DEQ notes that IPC calculated the dissolved oxygen deficits using measurements collected at the turbine water intake system. However, IPC proposes to include the aeration from the turbines and the first 0.7 miles of river downstream to attain the dissolved oxygen deficit measured at the turbine water intake system. DEQ will require measurement of dissolved oxygen supplementation at the turbine water intake system, to have consistency between location of the deficit measurement and the supplementation measurement.

DEQ received public comment noting that the dissolved oxygen minimum criteria may not be attained with distributed aeration at Brownlee powerhouse. In response to this public comment, the certification requires IPC to develop an alternative measures plan if the distributed aeration system does not achieve the mg/L requirement or the minimum dissolved oxygen criteria, measured within three miles downstream of Hells Canyon Dam.

#### **Oxbow bypass aeration**

IPC proposes to install and operate a destratification system in the Oxbow Bypass. This system would be located in the deep pool just upstream of the Indian Creek confluence. Thermal stratification in the deep pool causes anoxic conditions to develop in the deeper water. Mixing to prevent anoxic conditions will provide improved habitat for aquatic life. IPC proposes to use an air compressor stationed on the shore that pumps air through a pipe to bubble diffusers anchored on the channel bottom. As the bubbles rise through the water column, they entrain water and lift it to a higher elevation. IPC proposed a sufficient flow rate so that all the water volume within the pool would exchange approximately three times a day. IPC believes this will be a sufficient flow rate to prevent thermal stratification and prevent anoxia in the bypass.

#### **Riverside Operational Water Quality Improvement Project**

In the June 2018 application for section 401 certification, IPC determined that a phosphorus load reduction of 6,818 kg P is equivalent to the addition of 1,125 tons of oxygen. However, DEQ calculated the organic matter and phosphorus equivalents via fixed Redfield Ratio. Based on the Redfield ratio, the equivalent phosphorus load reduction is 7,162 kg P. The calculation is based on oxygen demand produced by the death and decay of algae and fixed algal cell Redfield ratio stoichiometry, and is discussed below.

#### **Organic Matter and Phosphorus Equivalents via Fixed Redfield Ratio**

The required amount of oxygen in kg used for the calculations:

$$957,272 \text{ kg} + 65,454 \text{ kg} = 1,022,726 \text{ kg O}$$

**Redfield ratios and atomic weights**

The calculations assume fixed ratios of C, N and O, as follows:

Element	Redfield Ratio (Atomic)	Atomic Weight	Redfield Ratio (Mass)
C	106	12.011	41.10
N	16	14.0067	7.235
P	1	30.97376	1
O		15.994	

The atomic weight of oxygen is 15.994. Therefore, the ratio of oxygen to phosphorus is as follows:

$$(138 \times 2 \times 15.994) / 30.97376 = 142.5$$

Via this ratio, 1,125 tons of oxygen (1,020,583 kg) of oxygen equates to  $1,020,583 \text{ kg} / 142.5 = 7,162 \text{ kg}$  of phosphorus.

IPC determined that a phosphorus load reduction of 6,818 kg P (15,000 lbs-P) is equivalent to the addition of 1,125 tons of oxygen. The amount derived via the Redfield ratio (above) and the amount derived by IPC are within 5% of each other, with the difference partly due to conversion from U.S. customary units to SI units. Considering uncertainty related to cell stoichiometry, which varies in response to environmental conditions, the 6,818 kg P (15,000 lbs-P) amount derived by IPC is a reasonable estimate of the equivalent reduction in phosphorus that will result in the required 1,125 tons of oxygen improvement in Brownlee Reservoir.

In order to remove an amount of phosphorus that is proportional to 1,125 tons of oxygen, the phosphorus needs to be in one of two forms: (1) phosphorus associated with particulate organic matter such as algae or detritus (particulate organic phosphorus), or (2) dissolved reactive phosphorus (orthophosphate). Particulate organic matter will settle in reservoirs and exert an oxygen demand when it decays aerobically, while orthophosphate is readily available for the growth of algae that will ultimately settle in reservoirs and exert an oxygen demand when it decays aerobically.

Phosphorus associated with inorganic sediments is not as likely to influence oxygen concentrations in the water column, since it is likely to settle to the bottom of reservoirs without contributing to oxygen deficits. The portion of the total phosphorus eliminated that is likely to influence dissolved oxygen concentrations is not precisely known, but the additional phosphorus reduction measures proposed by IPC, described below, will remove significant additional amounts of phosphorus.

IPC notes, "The estimated annual average phosphorus load reduction attributable to the ROWQIP has exceeded 15,000 lbs of phosphorus since 2011" (Idaho Power Company, 2018)(Page 220). Table 30 summarizes the modeled total phosphorus load reduction for the 2014-2017 irrigation seasons, (over 183 days of irrigation).



**Table 30: Modeled Total Phosphorus Load Reductions**

Year	Total Load Reduction (pounds/year)
2014	31840
2015	15826
2016	26818
2017	23800

**Grand View Sediment Reduction Program**

Monitoring data indicates that the Grand View sediment reduction program will remove significant sediment loads. Monitoring data also indicates that total phosphorus is associated with the sediment. Therefore, the Grand View sediment reduction program has the potential to remove significant additional amounts of phosphorus. DEQ concurs that additional measures to reduce the phosphorus load to the Snake River will assist in achieving the dissolved oxygen load allocation assigned to IPC.

**Swan Falls Project Aquatic Vegetation and Debris Removal**

IPC analyzed the total phosphorus concentrations in the wet materials collected at Upper Salmon Falls hydroelectric facility. These data indicate the wet materials contain phosphorus. Therefore, removing aquatic vegetation and debris from the Swan Falls trash rake will decrease the phosphorus load to the Snake River. Additionally, removing the organic matter at the trash rake prevents the organic matter from decaying in the river and exerting a dissolved oxygen demand. DEQ concurs this additional measure to reduce the phosphorus load to the Snake River will assist in achieving the dissolved oxygen load allocation assigned to IPC.

**DEQ Findings****Distributed Aeration Systems at Brownlee Powerhouse**

DEQ is reasonably assured that the dissolved oxygen deficit below Hells Canyon Dam will be addressed provided the following measures are implemented:

- Complete installation and testing of all four distributed aeration units.
- Operation of all four distributed aeration units to add 1.2 mg/L dissolved oxygen between July 1 and October 22 and add 1.5 mg/L dissolved oxygen between October 23 and December 31, as measured at the turbine water intake system at Hells Canyon dam.
- Development and implementation of a compliance monitoring plan. At a minimum the monitoring plan will include:
  - A description of the method IPC will use to determine whether the distributed aeration systems are achieving the required increase in dissolved oxygen.
  - Monitoring dissolved oxygen, intergravel dissolved oxygen and total dissolved gas at downstream locations.
  - Recommended monitoring locations and monitoring frequency.
  - Monitoring upstream total phosphorus concentrations.
- Annual reports submitted to DEQ which contain the following:
  - Updates on the implementation schedule progress.
  - Results of the testing phase including conclusions as to whether or not the installed units appear to be meeting expectations.
  - Discussion of issues or concerns and recommendations on adaptive management steps.
- IPC will evaluate the maximum dissolved oxygen that may be added by the distributed aeration system without causing a violation of the TDG criterion. IPC will evaluate alternative measures if the aeration systems do not achieve the average of added mg/L as described above, or

monitoring results collected within 3 miles downstream of Hells Canyon Dam indicate dissolved oxygen levels fall below minimum dissolved oxygen criteria.

- Annual reports which contain the following:
  - Results of dissolved oxygen and total dissolved gas monitoring.

### **Oxbow bypass aeration**

DEQ is reasonably assured that the Project operations under a new FERC license will not violate the dissolved oxygen criteria in Oxbow bypass provided IPC implement the following measures.

- Within one year of the date of the new FERC license for the Project, IPC shall submit to DEQ the final operating plan for the destratification system.
- The installation of the Oxbow Bypass deep-pool destratification system is complete, and in operation within six months of FERC's approval of the design, provided IPC can obtain the required permits and approvals in this period.

### **Riverside Operational Water Quality Improvement Project, Grand View Sediment Reduction Program, Swan Falls Project Aquatic Vegetation and Debris Removal Program**

DEQ is reasonably assured that the Project operations under a new FERC license will meet the dissolved oxygen load allocation, expressed as the 15,000 lbs P equivalent, provided IPC implement the following measures:

- IPC implements the ROWQIP plan, or its equivalent, for the duration of the new FERC license.
- A detailed monitoring plan is submitted to DEQ within 120 days of the new FERC license issuance for the Hells Canyon Complex. The minimum components of the monitoring plan are:
  - Measure total phosphorus in tributaries.
  - Measure total phosphorus in spill.
  - Measure total phosphorus in end of canal delivery system.
- IPC submits annual reports to DEQ providing monitoring results.
- IPC implements the Grand View Sediment Reduction Program.
- IPC submits a detailed monitoring plan for the Grand View Sediment Reduction Program to DEQ within 120 days of the new FERC license issuance for the Hells Canyon Complex. The minimum components of the monitoring plan are:
  - Total phosphorus concentrations in drains and tributaries in Grand View program area.
  - Total suspended solid concentrations in drains and tributaries in Grand View program area.
- IPC implements the Swan Falls Project Aquatic Vegetation and Debris Removal Program.
- A monitoring plan for the Swan Falls Program is submitted to DEQ within 120 days of the new FERC license issuance for the Hells Canyon Complex. The minimum components of the monitoring plan are:
  - Number of truckloads of aquatic vegetation and debris removed at the Swan Falls project annually between April 15 and October 15.
  - The total phosphorus removed from the Snake River following removal of aquatic vegetation and debris from the Swan Fall project.

### 7.2.3 Temperature:

Relevant sections of the applicable Oregon water quality standards for temperature are as follows:

#### **OAR 340-041-0002**

##### **Definitions**

(10) "Cold Water Refugia" means those portions of a water body where or times during the diel temperature cycle when the water temperature is at least 2 degrees Celsius colder than the daily maximum temperature of the adjacent well-mixed flow of the water body.

(20) "Epilimnion" means the seasonally stratified layer of a lake or reservoir above the metalimnion; the surface layer.

(24) "Hypolimnion" means the seasonally stratified layer of a lake or reservoir below the metalimnion; the bottom layer.

(36) "Metalimnion" means the seasonal, thermally stratified layer of a lake or reservoir that is characterized by a rapid change in temperature with depth and that effectively isolates the waters of the epilimnion from those of the hypolimnion during the period of stratification; the middle layer.

(37) "Migration Corridors" mean those waters that are predominantly used for salmon and steelhead migration during the summer and have little or no anadromous salmonid rearing in the months of July and August. Migration corridors are designated in Tables 101B and 121B and Figures 151A, 170A, 300A and 340A under OAR 340-041-0101 to 340-041-0340.

(51) "Salmon" means chinook, chum, coho, sockeye and pink salmon.

(52) "Salmon and Steelhead Spawning Use" means waters that are or could be used for salmon and steelhead spawning, egg incubation, and fry emergence. These uses are designated on the following subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Tables 101B, and 121B, and Figures 130B, 151B, 160B, 170B, 220B, 230B, 271B, 286B, 300B, 310B, 320B, and 340B.

(53) "Salmon and Trout Rearing and Migration Use" means thermally suitable rearing habitat for salmon, steelhead, rainbow trout, and cutthroat trout as designated on subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130A, 151A, 160A, 170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A.

(54) "Salmonid or Salmonids" means native salmon, trout, mountain whitefish and char including bull trout. For purposes of Oregon water quality standards, salmonid does not include brook or brown trout because they are introduced species.

(56) "Seven-Day Average Maximum Temperature" means a calculation of the average of the daily maximum temperatures from seven consecutive days made on a rolling basis.

#### **OAR 340-041-0028**

##### **Temperature**

(4)(a) The seven-day-average maximum temperature of a stream identified as having salmon and steelhead spawning use on subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Tables 101B, and 121B, and Figures 130B, 151B, 160B, 170B, 220B, 230B, 271B, 286B, 300B, 310B, 320B, and 340B, may not exceed 13.0 degrees Celsius (55.4 degrees Fahrenheit) at the times indicated on these maps and tables;

(d) The seven-day-average maximum temperature of a stream identified as having a migration corridor use on subbasin maps and tables OAR 340-041-0101 to 340-041-0340: Tables 101B, and 121B, and Figures 151A, 170A, 300A, and 340A, may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit). In addition, these water bodies must have coldwater refugia that are sufficiently distributed so as to allow salmon and steelhead migration without significant adverse effects from higher water temperatures elsewhere in the water body. Finally, the seasonal thermal pattern in Columbia and Snake Rivers must reflect the natural seasonal thermal pattern;

(e) The seven-day-average maximum temperature of a stream identified as having Lahontan cutthroat trout or redband trout use on subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Tables 121B, 140B, 190B, and 250B, and Figures 180A, 201A, 260A and 310A may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit);

(12)(f) Compliance Methods. Anthropogenic sources may engage in thermal water quality trading in whole or in part to offset its temperature discharge, so long as the trade results in at least a net thermal loading decrease in anthropogenic warming of the water body, and does not adversely affect a threatened or endangered species. Sources may also achieve compliance, in whole or in part, by flow augmentation, hyporheic exchange flows, outfall relocation, or other measures that reduce the temperature increase caused by the discharge.

(12)(g) Release of Stored Water. Stored cold water may be released from reservoirs to cool downstream waters in order to achieve compliance with the applicable numeric criteria. However, there can be no significant adverse impact to downstream designated beneficial uses as a result of the releases of this cold water, and the release may not contribute to violations of other water quality criteria. Where the Department determines that the release of cold water is resulting in a significant adverse impact, the Department may require the elimination or mitigation of the adverse impact.

Solar radiation, stream shade, ambient air temperatures, channel morphology, groundwater inflows, and stream velocity, volume, and flow influence water temperatures. Impoundments generally alter water temperature and thermal regimes by altering retention times within reaches, changing exposure time to heating and cooling influences, changing water depths, and reducing shading.

Water temperature has a profound effect on organisms that live or reproduce in the water. This is particularly true of Oregon's native "cold-water" fish such as salmon, bull trout and steelhead and for some amphibians (frogs and salamanders) and macroinvertebrates (aquatic insects). When water temperature becomes too high, salmon and trout (salmonids) suffer a variety of ill effects. With increasing temperature, salmonids experience sub-lethal effects of impaired feeding, decreased growth rates, reduced resistance to disease and parasites, increased sensitivity to toxics, intolerance during migration, reduced ability to compete with more temperature-resistant species and increased vulnerability to predation. If temperatures are high enough for sustained periods, mortality occurs. Elevated temperatures may also adversely affect other important water quality parameters (such as dissolved oxygen).

There is strong scientific evidence demonstrating that the earth is experiencing a rapid acceleration of global temperatures. Experts predict a faster rate of global warming in the next 100 years than experienced in the last 10,000 years. Climate change is likely to have harmful effects on fish and aquatic life as a result of impacts, such as but not limited to, warmer stream temperatures; reduced spring and summer stream flows with increased peak river flows; and increasing susceptibility to fish pathogens and parasitic organisms that are generally not injurious to their host until the fish become thermally stressed.

DEQ adopts biologically based numeric temperature criteria to support specific life stage and development activities of species that may currently occupy or have historically occupied certain ranges. Table 2 and Figures 2 -4 of this evaluation report identify the salmonid uses in the Snake River. The temperature criterion is based on a calculation of the seven-day average maximum (7dAM) temperature. The 7-day average maximum stream temperature is calculated by averaging the daily maximum instream water temperatures for seven consecutive days (Oregon Department of Environmental Quality, 2008)

### **Water Quality Trading**

In 2015, the Environmental Quality Commission adopted rules that establish the requirements for water quality trading in Oregon. These rules provide that DEQ may condition a 401 certification based on water quality trading consistent with Chapter 340, Division 39. The Snake River Stewardship Program qualifies as a trading plan pursuant to OAR 340-039-0025, and DEQ finds that this trading plan demonstrates compliance with applicable temperature criteria.

The elements of a Trading Plan include: the parameter for which the trading plan is developed; the trading baseline; trading area, a description of best management practices to be implemented; trading ratios; credits; monitoring; performance verification; tracking and reporting and adaptive management. DEQ reviewed Exhibit 7.1-7 of the June 2018 application “SRSP water quality trading crosswalk.” Exhibit 7.1-7 presents each required element of trading plans and the SRSP is evaluated against the required elements in the following paragraphs.

Parameter: IPC developed the SRSP to address temperature, which is a water quality parameter eligible for water quality trading under OAR 340-039-0015.

Trading baseline: OAR 340-039-0005(6) defines the trading baseline as “Pollutant load reductions, BMP requirements, or site conditions that must be met under regulatory requirements in place at the time of trading project initiation.” The trading baseline describes requirements that are separate from requirements included as part of a trading plan. The trading baseline must account for regulatory requirements applicable to the trading project at the time of trading project initiation. The regulatory requirements include: NPDES permit requirements; Oregon Department of Agriculture rules issued for an agricultural water quality management area; Oregon Board of Forestry rules; requirements of a federal management plan; requirements under a section 401 certification; local ordinances, tribal laws; other nonpoint source requirements; permits required under section 404 of the Clean Water Act; and regulatory requirements a designated management agency establishes to comply with a DEQ-issued TMDL or water quality management plan.

IPC describes the trading baseline in Exhibits 7.1-5 and 7.1-7 of the June 2018 application for section 401 certification. DEQ agrees with how the trading baseline was determined. DEQ also finds that the SRSP’s proposed in-stream habitat restoration, and flow augmentation projects, if any, would not be included in the trading baseline because such projects are not required under any federal, state or local regulatory requirements. DEQ will require IPC to record the baseline for each project and report the baseline information in the annual report.

DEQ also agrees that if thermal benefits are obtained from a NPDES permit holder in the SRSP program area or where currently applicable Board of Forestry rules apply, if any, that such benefits would be considered part of the trading baseline. Accordingly, IPC will ensure that the actions generating those benefits are not already required by any NPDES permit or Board of Forestry rule.

IPC proposes to implement riparian re-vegetation projects in the tributaries to the Snake River. IPC notes, “Riparian re-vegetation implementation in the SRSP will likely be prioritized on private and nonfederal public property, maximizing the benefits of restoration actions on project sites where there is not a current

management mandate or obligation to restore instream or riparian habitat” (Exhibit 7.1-5, pg. 62). Required restoration projects on federal land are, therefore, not included in the trading baseline. Because the riparian restoration projects will likely be prioritized on private and nonfederal public property, rules that address requirements on these properties are relevant to the trading baseline. IPC notes that currently no state, local or tribal requirements apply to private agricultural properties within the SRSP program area within Idaho. IPC further notes that, depending on a property’s location within the SRSP program area, it may be subject to a county or city comprehensive plan, zoning ordinances, subdivision ordinances or other local code requirements. However, currently there are no county or city riparian requirements within the SRSP program area within Idaho. The SRSP did not identify any tribal laws, rules or permits, or other currently applicable rules affecting nonpoint source requirements.

IPC notes that currently no state, local or tribal requirements apply to private agricultural property within the SRSP program area in Oregon (Exhibit 7.1-5, pg. 63). The SRSP program area overlaps with four Oregon agricultural management plan (AgWQMP) areas: Owyhee, Malheur, Burnt, and Powder/Brownlee. IPC notes that the Oregon Administrative Rules that apply to these agricultural management areas do not require riparian re-vegetation projects, rather the rules protect against activities that will degrade riparian vegetation. For example, rules governing the Owyhee Agricultural Water Quality Management Area state, “no person may contribute to conditions that preclude establishment and development of adequate riparian vegetation for streambank stability and shading, consistent with site capability (OAR 603-095-2740(3).” As with Idaho, depending on a property’s location within the SRSP program area in Oregon, it may be subject to a county or city comprehensive plan, zoning ordinances, subdivision ordinances or other local code requirements. However, currently there are no county or city riparian requirements within the SRSP program area within Oregon. As IPC identifies areas to implement re-vegetation projects as part of the SRSP, IPC will consider and document the local conditions when determining project eligibility.

Description of best management practices to be implemented: OAR 340-039-0005(1) defines best management practices as in-water or land-based conservation, enhancement or restoration actions that will reduce pollutant loading or create other water quality benefits. BMPs include, but are not limited to, structural and nonstructural controls and practices and flow augmentation. The SRSP includes two types of restoration actions: in-stream habitat restoration projects in the Snake River and riparian re-vegetation projects in tributaries to the Snake River. The restoration actions will reduce pollutant loading as well as create additional water quality benefits. The proposed restoration actions are consistent with the definition of BMPs provided in Oregon Administrative Rules.

Trading area: OAR 340-039-0005(5) defines a trading area as “A watershed or other hydrologically-connected geographic area, as defined within a water quality management plan adopted for a TMDL, trading framework or trading plan. A trading area must encompass the location of the discharge to be offset, or its downstream point of impact, if applicable, and the trading project to be implemented.” The application for section 401 certification contains a map of the areas where the BMPs will be implemented, included in this evaluation as Figure 20. As seen in Figure 20, the SRSP program area allows for projects: 1) located below Swan Falls Dam and upstream of HCD in the Snake River, and 2) located on hydrologically connected tributaries to the Snake River upstream of the HCD (including but not limited to): Boise River, Brownlee Reservoir creeks, Burnt River, Malheur River, Middle Snake-Payette River, Owyhee River, Payette River, Pine Creek, Powder River, Succor Creek, and Weiser River. The temperature exceedance below Hells Canyon Dam is the discharge offset by the trading plan.

Trading ratios: OAR 340-039-0005(10) defines a trading ratio as “A numeric value used to adjust the number of credits generated from a trading project, or to adjust the number of credits that a credit user needs to obtain.” The trading plan rules (OAR 340-039-0025(5)(e)) require: a description of applicable trading ratios, the basis for each applicable trading ratio, including underlying assumptions for the ratio,

and a statement indicating whether those ratios increase or decrease the size of a credit obligation or the number of credits generated from an individual trading project. The trading ratios must account for variables such as attenuation of the water quality benefit or uncertainty of BMP performance or water quality benefit measurement or estimate. As described earlier, IPC calculated the thermal load exceedance at the outflow of Hells Canyon dam, this exceedance is IPC's thermal load obligation. IPC then applied a 10% margin of safety that accounts for uncertainty in the benefit measurements and BMP performance. The 10% margin of safety is in addition to the attenuation factors. Additionally, IPC applied an in-reservoir attenuation factor of 50% to the thermal load exceedance. The 50% attenuation factor is equivalent to a 2:1 trading ratio. When the thermal benefits from riparian re-vegetation projects are estimated, IPC will apply an in-river attenuation value of 22-25%. The 25% attenuation factor is equivalent to a 3:1 trading ratio. Addition of the trading ratios increases the size of the thermal load obligation. The certification requires implementation of Exhibit 7.1-5 of IPC's June 2018 application for water quality certification, with the exception of language that incorrectly stated that attenuation at the project level was not required to account for river attenuation. The bkcal requirement at the project inflow includes attenuation through the reservoir. It does not include river attenuation.

Credits: OAR 340-039-0005(3) describes a credit as "A measured or estimated unit of trade for a specific pollutant that represents the water quality benefit a water quality trading project generates at a location over a specified period of time, above baseline requirements and after applying trade ratios or any other adjustments." The trading plan must include a description of the credits, including the number of credits needed and a schedule for credit generation, a description of how the credits will be quantified and how long the credits will be used. IPC's thermal load obligation is defined in units of billion kcal. As noted earlier, the thermal load obligation is 1,191.6 bkcal. IPC proposes to recruit 0.5 to 1% of the bkcal in the first year following license issuance. IPC notes that 15 years after FERC re-licensing is complete 50% of the thermal obligation will be implemented and 30 years after FERC re-licensing is complete 100% of total thermal obligation will be implemented.

Monitoring: OAR 340-039-0025(5)(g) notes that the trading plan must include a description of the proposed methods and frequency of trading project BMP monitoring; and the proposed methods and frequency of how water quality benefits generated by a trading project will be monitored. IPC notes that the SRSP discussion (Exhibit 7.1-5, Section 2.6.2) includes a description of the three tiered monitoring method proposed for the SRSP, as well as a description of how frequently those monitoring activities will take place. The three tiered monitoring includes:

- (1) Rapid qualitative monitoring on project sites. The goal of rapid qualitative monitoring is to ensure that all projects remain in place and are continuing to demonstrate progress toward modeled conditions for achievement of thermal benefits. IPC will conduct qualitative monitoring annually on every project site from project implementation through "establishment," which is expected to be five to ten years post-implementation for both riparian and in-stream projects. Once the project is established, qualitative monitoring will occur less frequently, but will last for the license term.
- (2) Remote effectiveness monitoring of the SRSP program area. IPC will also monitor all implemented project sites periodically via remote sensing (i.e., LiDAR, satellite imagery, etc.). This type of monitoring allows for comparison of the estimated thermal benefits of projects against actual conditions. IPC will collect remote imaging data for all project sites in the SRSP at approximately five-year intervals.
- (3) Quantitative monitoring will occur on the ground at a sample of project sites. Once a project site has been selected for quantitative monitoring, it will be monitored quantitatively for the remaining life of the SRSP.

Performance verification: OAR 340-039-0025(5)(h) notes that the trading plan must include a “description of how the entity will verify and document for each trading project that BMPs are conforming to applicable quality standards and credits are generated as planned.” IPC notes that the SRSP verification procedure has two key components: 1) third-party confirmation that every project has been implemented consistent with restoration quality standards and guidelines; and 2) annual randomized project site audits of a percentage of projects by independent third party reviewers. The site audits will be conducted to confirm that projects are being maintained, monitored and tracked consistent with restoration quality standards and guidelines such that they are likely to achieve the modeled thermal benefits at the program’s conclusion (Idaho Power Company, 2018)(Exhibit 7.1-5, Page74).

Tracking and reporting: Under OAR 340-039-0025(5)(i) the trading plan must include a description of how credit generation, acquisition and usage will be tracked and how this information will be made available to the public. IPC will track SRSP progress via a publicly accessible tracking and reporting website. This website will serve to track thermal benefit totals as they accrue, and will include project design and monitoring information and the results of implementation and performance confirmations (Idaho Power Company, 2018)(Exhibit 7.1-5, Page 74).

Adaptive management: As described in OAR 340-039-0025(6), trading plans must include a description of how monitoring and other information may be used over time to adjust trading projects and under what circumstances. The SRSP incorporates the ability to adapt implementation, maintenance, monitoring, and performance tracking practices to reflect new information. Exhibit 7.1-5, Section 3 of the June 2018 application describes the adaptive management approach in more detail. These adaptive management provisions comply with OAR 340-039-0025(6) because the required maintenance and monitoring ensures that individual project success and ecological improvements are made over time.

#### **Current Water Quality Status and Applicable Criteria:**

The Hells Canyon Complex alters Snake River temperatures as compared to conditions that occurred prior to project construction. Brownlee reservoir has an average hydraulic retention time of about one month and substantially alters Snake River temperatures. Storage of water in the reservoir and the depth of the powerhouse intake have delayed seasonal warming and cooling of water downstream of the Brownlee dam compared to conditions that occurred prior to project construction. As seen below in Figure 13 the peak mean monthly temperature in Brownlee outflow occurs in September under current conditions (data from the 1990s) (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(Page 163). Under historic conditions (1957 data) the Snake River at Brownlee dam location, experienced the peak mean monthly temperature in July.



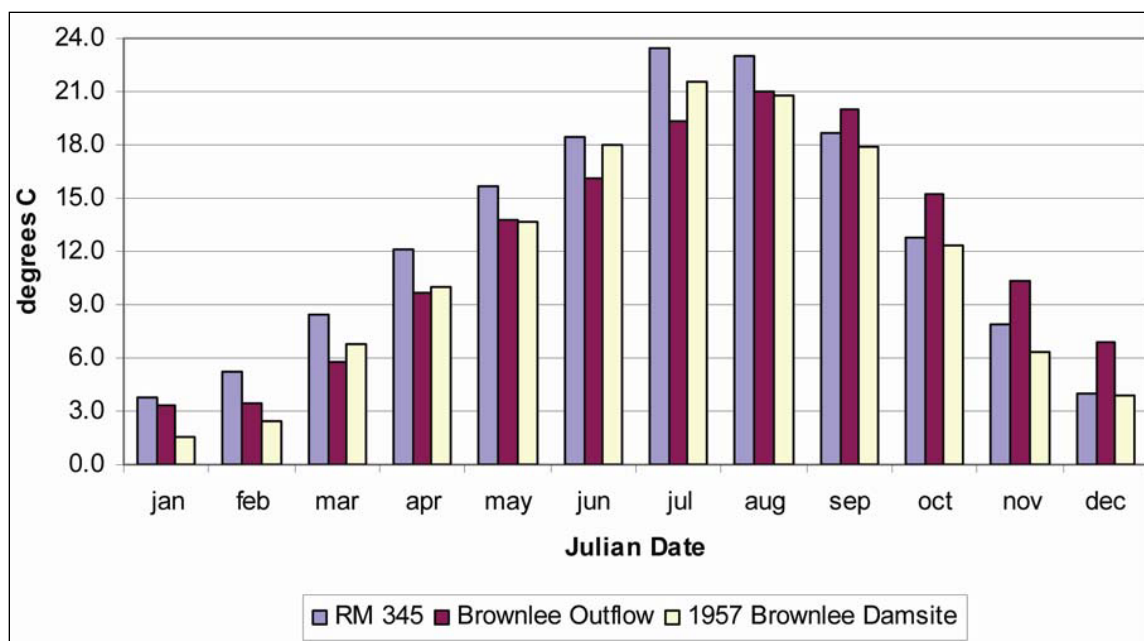


Figure 13: Mean monthly temperature for the Brownlee Reservoir segment of the Snake River

As seen in Table 31, Brownlee reservoir has an average retention time of about one month, with little additional retention time in Oxbow or Hells Canyon reservoirs (Federal Energy Regulatory Commission, 2007)(page 59-60). Because the Snake River moves more quickly through Oxbow and Hells Canyon reservoirs, temperatures in these reservoir reaches are mainly determined by the temperature of releases from Brownlee dam.

Table 31: HCC Reservoir Characteristics

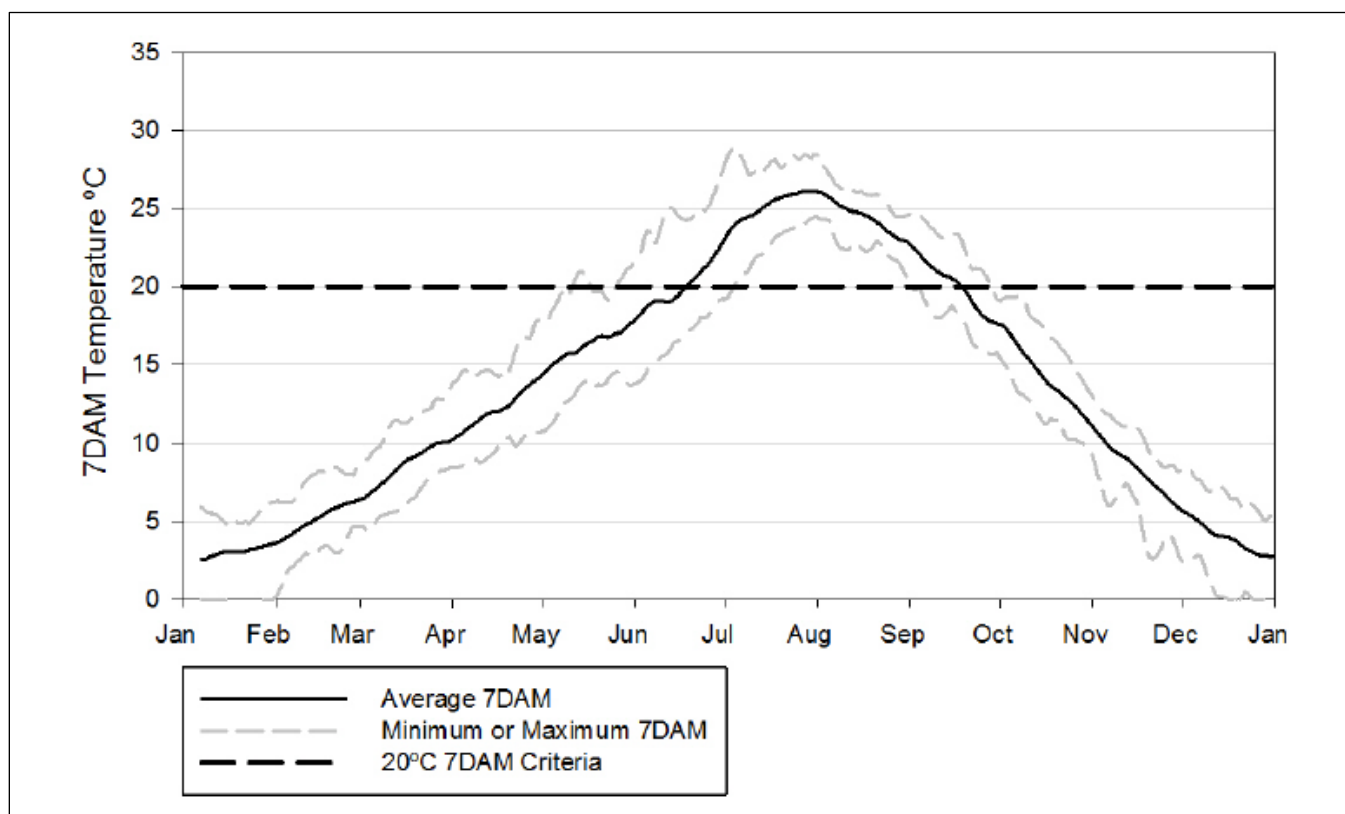
Characteristics	Brownlee Reservoir	Oxbow Reservoir	Hells Canyon Reservoir
Drainage basin area (square miles)	72,590	72,800	73,300
Surface area (acres)	15,000	1,150	2,412
Length (river miles)	58	12	25
Shoreline perimeter (miles)	193	26	56
Total volume (acre-feet)	1,420,000	57,500	170,000
Full pool (feet msl)	2,077	1,805	1,688
Minimum pool (feet msl)	1,976	1,800	1,683
Mean depth (feet)	100	50	70
Maximum depth (feet)	300	81	245
Mean width (feet)	2,242	795	1,000
Average retention time (days)	36	1.4	4
Penstock centerline elevation (feet msl)	1,948	1,750	1,571.5
Maximum powerhouse discharge (cfs)	35,000	28,000	30,500

Figure 15 shows the high water temperatures within Brownlee Reservoir, particularly in the epilimnion. High water temperatures seen within the Project area is likely affecting dissolved oxygen levels, and increasing algae and fungi productivity. Low dissolved oxygen, combined with high summer water temperatures can have significant negative effects on fish and other aquatic life.

**Redband or Lahontan Cutthroat Trout 20°C Criterion**

The Snake River from Hells Canyon Dam to Idaho border (approximate river miles 247.5 to 409) is designated for Redband or Lahontan Cutthroat Trout. This designation applies from Hells Canyon upstream, including within Hells Canyon reservoir, Oxbow reservoir and Brownlee reservoir. As noted above, the applicable temperature criterion is 20°C.

IPC has measured Snake River temperature inflow to Brownlee Reservoir (RM 345.6) either hourly or every 10 minutes from 1996 through 2017. According to IPC’s data, inflowing temperatures exceeded Oregon’s 20°C 7dAM criterion from July 4 through September 1. (Figure 14).



**Figure 14: Snake River Brownlee Reservoir inflow temperature for 1996 -2017. (IPC June 2018 application, Figure 6.1-1)**

Brownlee Reservoir contains three distinct zones: the riverine zone, the transition zone, and the lacustrine zone. As noted in the Snake River Hells Canyon TMDL, “each zone represents different hydrological and pollutant transport/processing characteristics” (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(Page 139). DEQ agrees with the following description from the section 401 application, “The riverine zone develops in the upstream reaches of a reservoir and is characterized by a temperature similar to that of the upstream river (i.e., a slower, broader river). The transition zone, as the name implies, is the reach of the reservoir between the riverine and lacustrine zones. The lacustrine zone (the zone farthest downstream) is characterized by lake-like hydrodynamics.

Similar to lakes, the lacustrine zone exhibits thermal stratification with the classic strata: epilimnion, metalimnion, and hypolimnion that develop in early spring and persist through late fall (pg. 43).” An example of thermal stratification is provided in Figure 15, for July, August and September in an average (1995), high (1997), and low (2002) water year. These data indicate that the 20°C criterion is exceeded in the epilimnion in Brownlee Reservoir.

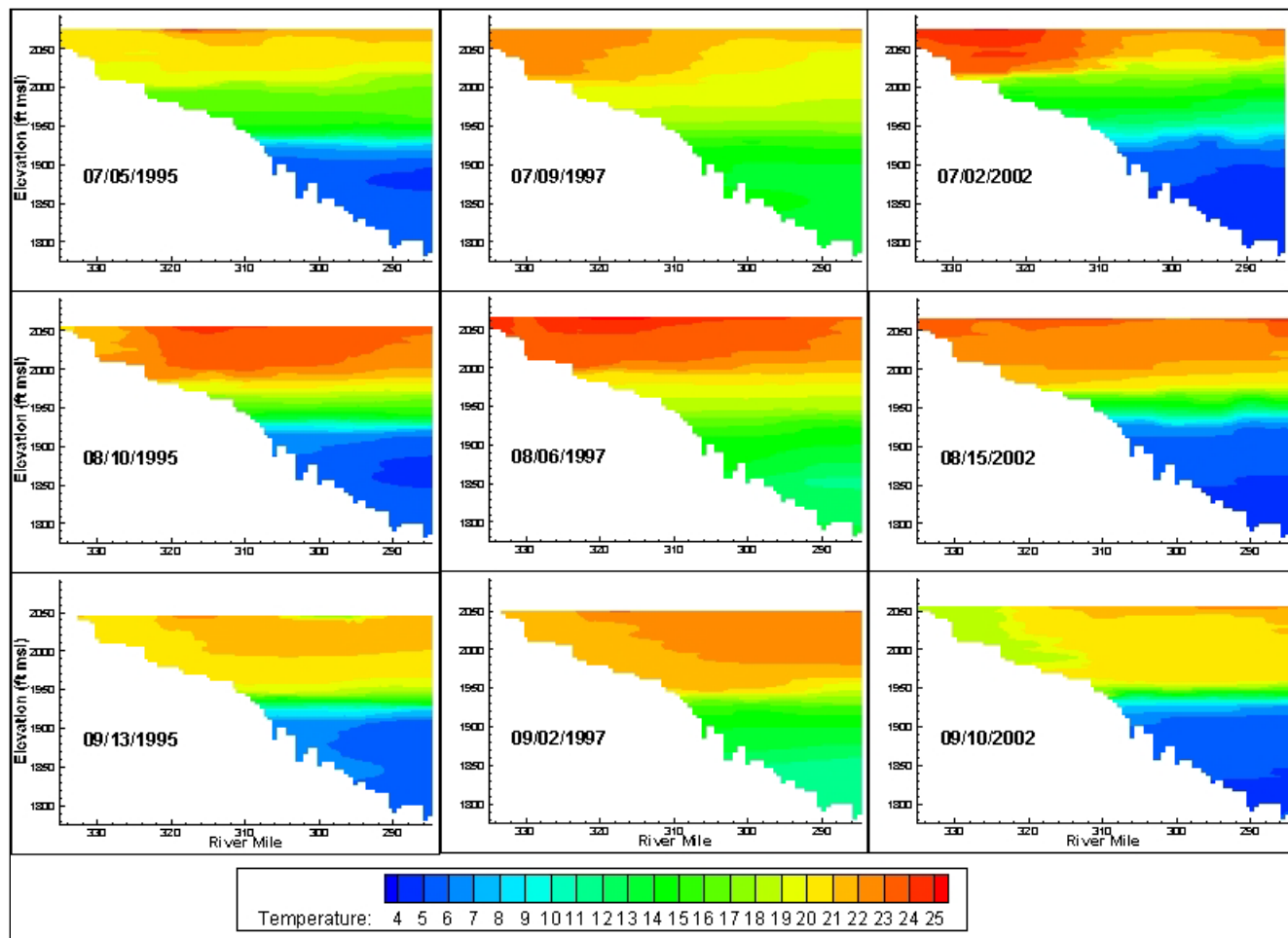


Figure 15: Brownlee Reservoir temperature. (IPC June 2018 application, Figure 6.1 - 4)

IPC provided no temperature data for Oxbow Reservoir within the section 401 application. However, in the *New license application: Hells Canyon Hydroelectric Project*, IPC notes “Thermal stratification is virtually nonexistent throughout the main section of Oxbow Reservoir between the tailwater of Brownlee Dam and the Oxbow powerhouse intakes during average- and high-flow years. Relatively high velocities and short residence times seem to prevent a thermal structure from developing. However, a relatively weak stratification structure can develop during the summer of low-flow years, such as 1992 (pg. 20) (Idaho Power Company, 2003).” DEQ agrees with IPC’s assessment regarding stratification. Limited temperature data from 1992 for Oxbow Reservoir is presented in the New License Application (page 129, Figure 18).

IPC provided no temperature data for the Hells Canyon Reservoir within the section 401 application. As noted in the *New License Application: Hells Canyon Hydroelectric Project*, “Hells Canyon Reservoir is relatively isothermal compared to Brownlee Reservoir. The reservoir stratified only during low-flow

conditions (page 23) (Idaho Power Company, 2003).” Several temperature profiles for Hells Canyon Reservoir are provided in the *New License Application: Hells Canyon Hydroelectric Project* for the summer 1996. These temperature profiles indicate exceedance of the 20°C criterion at various locations in the Hells Canyon Reservoir (page 134, Figure 23) (Idaho Power Company, 2003).

Neither the water flowing into the Hells Canyon Complex, nor the water flowing out of the Hells Canyon Complex is compliant with the 20°C criterion at all times, as seen in Figure 16, below. Figure 16 shows the average 7 dAM temperatures for water flowing into Brownlee Reservoir (HCC inflow average) and out of HCD (HCC outflow average) over the period of record. Average values on any given day are the average of the daily 7-day average maximum for each year over the period of record. The period of record for outflow is 1991 to 2017, and the period of record for inflow is 1996 to 2017.

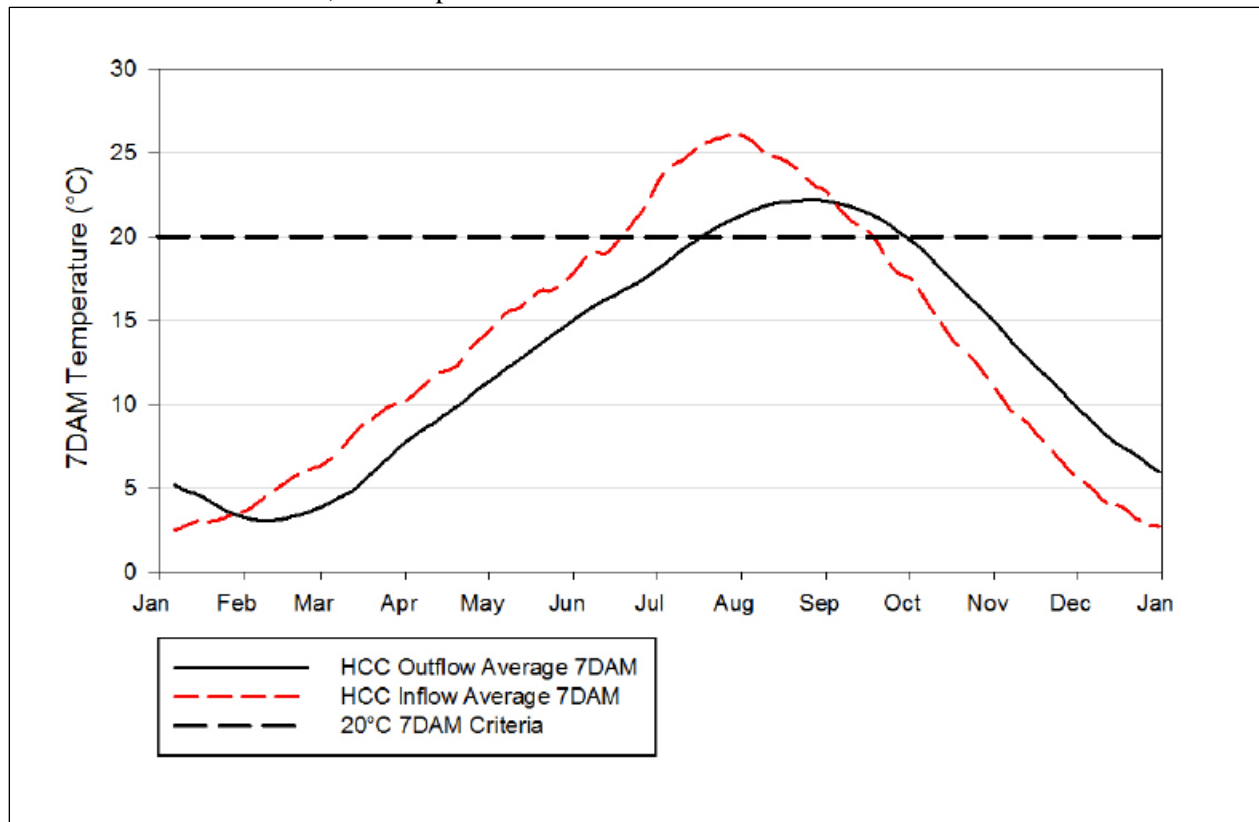


Figure 16: Average 7 dAM temperature for water flowing into Brownlee and water flowing out of Hells Canyon Dam. (IPC June 2018 Application, Figure 6.1-5)

**Salmon and Steelhead Migration Corridor Criterion: 20°C**

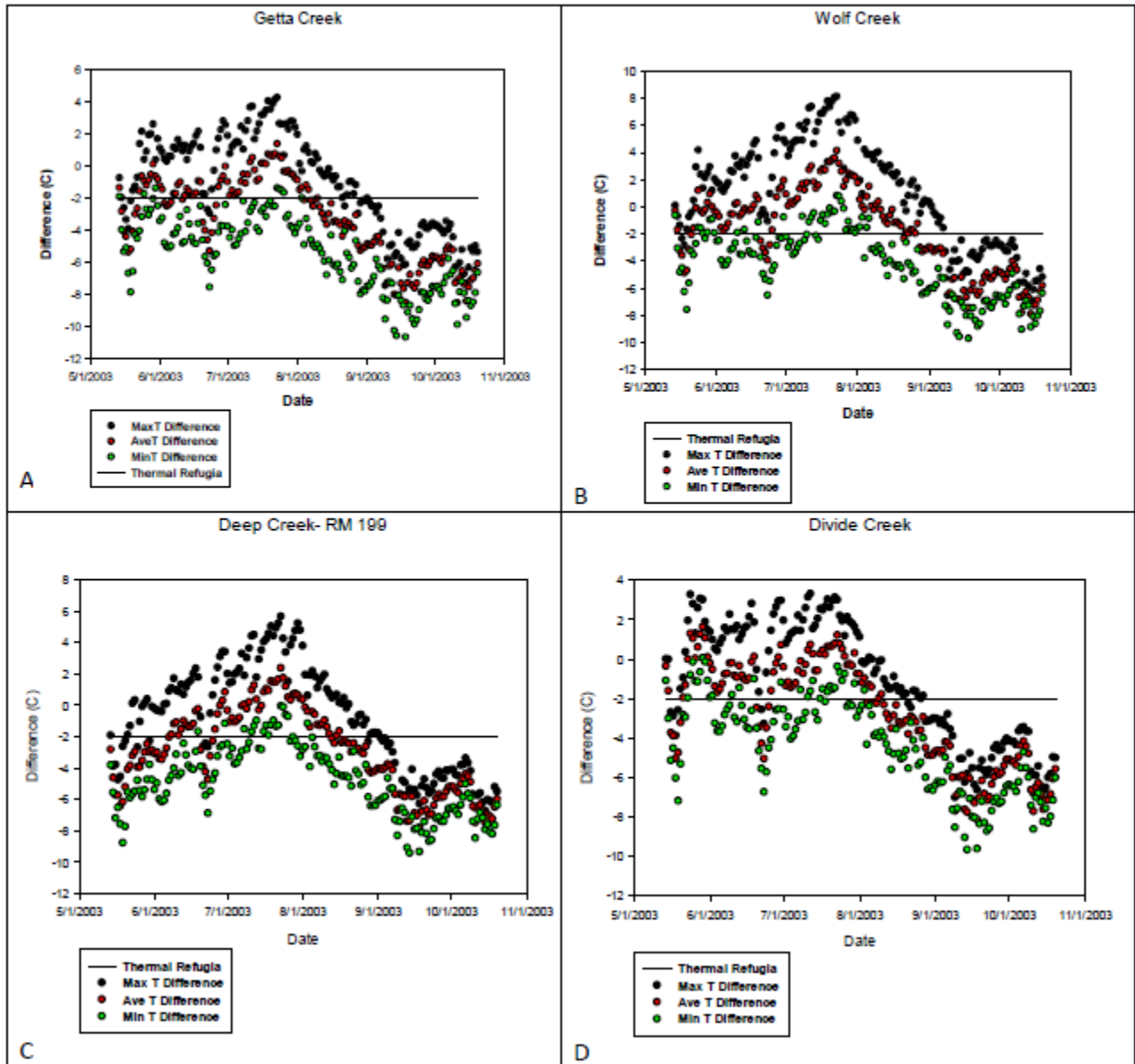
The Snake River from the Oregon/Washington Border to Hells Canyon Dam (RM 169 to RM 247.5) is designated for Salmon and Steelhead Migration Corridors with an applicable criterion of 20°C, as well as requirements for sufficient cold-water refugia and a natural seasonal thermal pattern. As seen in Figure 16, water flowing out of Hells Canyon Dam exceeds the 20°C criterion during the summer to early fall.

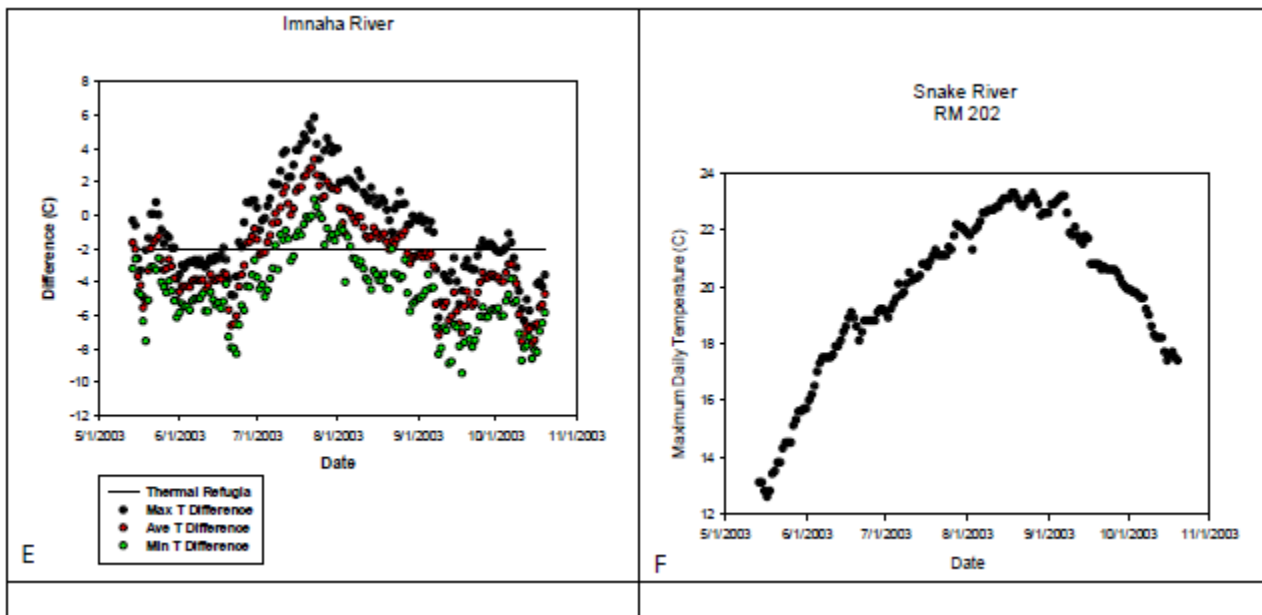
**Salmon and Steelhead Migration Corridor Criterion: cold-water refugia**

As described in Oregon’s water quality standards, the cold water refugia "means those portions of a water body where or times during the diel temperature cycle when the water temperature is at least 2 degrees Celsius colder than the daily maximum temperature of the adjacent well-mixed flow of the water body.”

IPC provided graphs that compare daily temperature metrics at several tributaries in Hells Canyon to the daily maximum temperature in the Snake River. Figure 17 compares (Idaho Power Company,

2018)(Exhibit 6.1-1. Figure 7), the Snake River RM 202 location to tributaries that enter the Snake River between RM 206 and RM 190. The tributaries included in the comparison are Getta Creek (RM 205), Wolf Creek (RM 202), Deep Creek (RM 199), Divide Creek (RM 193) and the Imnaha River (RM 191). All of the tributaries provide cold water refugia during at least some portion of the day, with the exception of a few days in the middle of July, when none of the tributary measurements are colder (by at least 2°C) than the maximum Snake River temperature. IPC provided additional data to compare the Snake River at RM 247 to tributaries between RM 247 and RM 220. Granite Creek (RM 239), Bernard Creek (RM 235), Three Creeks (RM 238) all provided cold-water refugia during the day. IPC notes that these tributaries originate in high elevation headwaters associated with the Seven Devils Mountains of Idaho, and as such, they originate in a much cooler thermal regime than the lower elevation tributaries.





**Figure 17: Cold Water Refugia Data, RM 202.**

A negative value represents the tributary daily maximum temperature being cooler than the corresponding mainstem Snake River.

#### **Salmon and Steelhead Migration Corridor Criterion: natural seasonal thermal pattern**

The following narrative criterion also supplements the biologically-based numeric temperature criteria for Salmon and Steelhead Migration Use: “the seasonal thermal pattern in Columbia and Snake Rivers must reflect the natural seasonal thermal pattern.” (Referred to hereinafter as “NSTP”).

The project delays seasonal warming and cooling of water downstream as compared to conditions that occurred prior to project construction. Figure 16 depicts this thermal shift. Current and proposed operations cause water temperatures to be cooler than without project conditions in spring and summer and warmer than without project conditions in the fall.

In general, ODFW advises that a significant thermal shift can affect the designated beneficial uses, fish and aquatic life use and fishing, in two ways. In the fall, a modification to a thermal pattern causes high water temperatures to remain in the fall, which can adversely affect the survival of fish until spawning and the viability of eggs after spawning. Fall cooling is important to protect the migration of adult salmon upstream and spawning. Many northwest rivers cool quite rapidly in the fall. In the spring, impoundments delay warm water from passing downstream in a manner that slows the growth of newly emerged fry, which can adversely affect survival during rearing and outmigration. Figure 13 compares pre-project temperature conditions to recent/Project temperature conditions and demonstrates delayed fall cooling because of current operations.

#### **Salmon and Steelhead Spawning through Fry Emergence criterion: 13°C**

The Snake River below the Hells Canyon dam is designated for Salmon and Steelhead Spawning through Fry Emergence. The Salmon and Steelhead Spawning through Fry Emergence designated use applies from October 23 through April 15 from below Hells Canyon Dam to the confluence with the Salmon River (RM 188) and from November 1 through May 15 from the confluence with the Salmon River to the OR/WA border (RM 169), with an applicable criterion of 13°C.

Exhibit 6.1-3 of the June 2018 section 401 application presents detailed temperature data. Oregon’s water quality standards define the seven-day-average maximum temperature as "a calculation of the average of the daily maximum temperatures from seven consecutive days made on a rolling basis (OAR 340-041-0028(4)(a))." The first applicable 7-day average occurs on the seventh day of the period (Oregon Department of Environmental Quality, 2008)(Page 21). The salmonid spawning temperature criterion below the Hells Canyon Complex starts on October 23, so the seven-day-average maximum temperature is first calculated on October 29. As seen in Figure 16, outflow from Hells Canyon Dam exceeds the 13°C spawning criterion, expressed as a 7-day average maximum temperature. Table 1 of Exhibit 6.1-3 depicts the daily Hells Canyon Complex outflow 7 seven-day-average maximum temperatures exceedance for each day in the period of record of 1991-2017. As seen in Table 1, the 13°C spawning criterion is exceeded every year on October 29. Generally, the outflow temperature decreases to the spawning criterion by the second to third week in November, so the time period of exceedance of the spawning criterion is typically about two weeks.

**Applicant’s proposed measures:**

IPC developed the Snake River Stewardship Program (SRSP) to address the exceedance of the spawning criterion at the discharge of Hells Canyon Complex. Recent temperature data, specifically from 2014 and 2015, demonstrated brief periods when temperatures exceeded 17°C at the beginning of the salmonid spawning period. IPC notes that NOAA fisheries recognized that Snake River temperatures might increase in the future and there is uncertainty as to how this temperature increases may effect Snake River Fall Chinook. IPC notes, “To assist in addressing this uncertainty, IPC is supplementing its previous SRSP proposal by incorporating actions that more directly influence water temperature in the early portion of the SRFC spawning period. Specifically, IPC proposes a Brownlee operational component that, in conjunction with the SRSP, is expected to address water temperatures below the HCD in excess of 16.5°C” (Idaho Power Company, 2018)(Page 156) .The SRSP and the Brownlee operational component are described below.

**Snake River Stewardship Program**

The SRSP will provide temperature benefits to the Snake River and include monitoring and reporting components to determine compliance with milestones; and, if required by DEQ, implementation of alternative or supplemental measures through an established adaptive management process. As noted in the application “The SRSP is a landscape scale watershed program with the primary objective of implementing measures upstream of the HCC (in-river and within tributaries) that will provide aggregate thermal benefits” (Idaho Power Company, 2018)(Page 167).

The proposed SRSP includes development and implementation of the following actions:

- In-stream habitat restoration projects in the Snake River to reduce surface area exposure to thermal loading from the sun and may provide additional shade from plantings:
  - Floodplain enhancement projects
  - Island creation projects
  - Inset floodplain creation
  - Emergent wetland creation
- Riparian revegetation projects in tributaries of the Snake River that would produce shade and reduce thermal loading from the sun.

IPC notes that “If new or additional restoration actions are identified that provide quantifiable thermal benefits, IPC may incorporate these actions into the SRSP after appropriate review and approval from the DEQs, and as required by FERC” (Idaho Power Company, 2018)(Page 179). For example, instream flow augmentation activities in tributaries of the Snake River could be used to increase thermal buffering capacity. The following section describes the actions to address the Hells Canyon Complex temperature obligations:



- (1) IPC has identified 55 potential instream restoration projects in the Snake River between Walters Ferry and Homedale, Idaho. The instream habitat restoration will reduce surface area exposure to thermal loading from the sun by reducing water surface area, increasing water velocities and channel depths of the Snake River. The proposed projects include island enhancements, island creation, inset floodplain development, and emergent wetland development. Implementation of instream restoration actions will create thermal benefits credited toward IPC's cumulative thermal load exceedance. Detailed descriptions of the in-stream habitat restoration projects are included in "Exhibit 7.1-5 Snake River Stewardship Program (SRSP) for thermal compliance with the relicensing of the Hells Canyon Complex", with attached draft restoration quality standards and guidelines included as part of the June 2018 application for section 401 certification.
- (2) Riparian revegetation will occur within some or all of the subbasins in Figure 18. IPC notes, "By increasing the amount of vegetation along these key waterways, less thermal load from the sun will reach the water. Riparian revegetation will help to restore microclimates and functional ecological conditions to the riparian ecosystem" (Idaho Power Company, 2018)(Exhibit 7.1-5, Page 27).
- (3) IPC notes, "As lessons are learned through implementation of research projects and as quantification methodologies improve, it may be appropriate to include additional restoration actions in the SRSP portfolio if they are ecologically suitable and the benefits can be quantified as thermal load units (Idaho Power Company, 2018)(Exhibit 7.1-5, Page 29). A potential new restoration action is flow augmentation in the Snake River and its tributaries. IPC notes, "High water temperature, low levels of dissolved oxygen, and deleterious levels of toxins can all be exacerbated by low stream flow (Beechie et al. 2008, 2010; Hester and Gooseff 2010). Moreover, the quantity, quality and connectivity (e.g., fish migration) of aquatic habitats are also influenced by stream flow" (Idaho Power Company, 2018)(Exhibit 7.1-5, Page 29). While the thermal benefits of flow augmentation are not yet effectively quantified, IPC will work to better estimate the thermal benefit and may seek approval of a methodology to allow the thermal benefits to be counted towards the thermal load exceedance.

Figure 18 is a map of areas to be included in the SRSP.



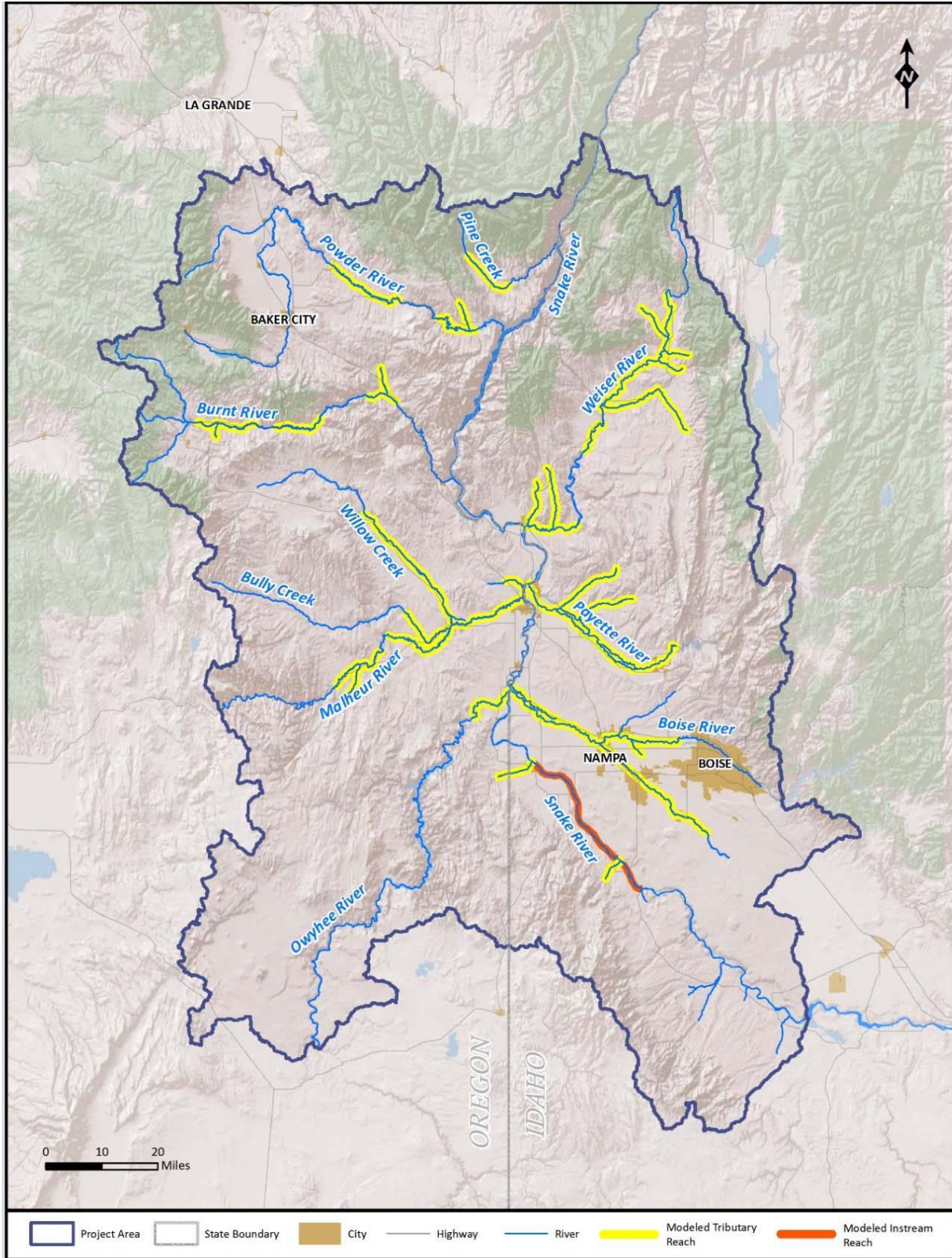


Figure 18: Map of SRSP area with thermal benefits modeled for restoration project implementation highlighted. (Figure 13, Exhibit 7.1-5)

In order to offset the cumulative thermal load exceedance below Hells Canyon dam during the spawning period, IPC must quantify the thermal benefits of the SRSP projects. IPC notes that “there are 3 models or methods available for quantifying thermal benefits from the various project types: 1) Shade-A-Lator for riparian re-vegetation and re-vegetation components of the in-stream projects, 2) wetland energy budget models for emergent wetlands, and 3) a suite of currently available models for surface-area changes associated with island projects” (Idaho Power Company, 2018)(Page 179)”. IPC proposes that the modeled thermal benefits for each project will be determined and documented in the project planning and design phase. Following project completion, the modeled thermal benefits of the project will be aggregated for the July through October 29 period, and then added to other projects to offset the HCC outflow cumulative thermal load exceedance. Table 32 summarizes the potential total thermal benefits from restoration actions proposed in the SRSP. As noted earlier, IPC will need to apply an in-river or in-tributary attenuation factor to the project’s thermal benefit. The potential total thermal benefit supply is 3,649 bkcal.

**Table 32: Summary of potential thermal benefits from SRSP (Exhibit 7.1-5, Table 3)**

<b>Restoration Action</b>	<b>Total Available</b>	<b>July-October Mean Daily Thermal Benefit (bkcal/day)</b>	<b>Total Thermal Benefit from July-October (bkcal)</b>
Riparian Revegetation	554 miles	14.9	1,799.5
Instream Modifications	644 acres	15.2	1,849.8
Total SRSP		30.1	3,649.3

### **Milestones, Monitoring and Reporting:**

IPC proposes to conduct project monitoring using a three-tiered approach:

- Qualitative (i.e., project) monitoring at all sites to ensure projects remain in place and continue to demonstrate progress toward forecasted conditions.
- Remote effectiveness monitoring at all sites to track thermal benefit progress of projects over a broad geographic area.
- Quantitative (i.e., effectiveness) monitoring on a selected sample of projects representative of the in-stream habitat and riparian revegetation project types. IPC will use this to generate confidence that projects are tracking toward performance objectives and modeled conditions (e.g., percentage canopy cover for riparian projects). IPC will use monitoring results to improve and adaptively manage the effectiveness of site implementation and maintenance for future projects.

All of the monitoring results will provide feedback to the modeling, generation, and accounting, tracking, and reporting of the thermal benefits applicable to the Hells Canyon Complex thermal obligation. IPC proposes to provide the DEQs with annual reports. Pages 184-185 of the June 2018 application for water quality certification contains details on the annual reports. IPC also proposes to submit a 5-year review statement every fifth year following issuance of the FERC license. Lastly, IPC is currently involved in a collaborative study with the USGS to answer some of the questions about the fate and transport of methyl mercury within and below the Hells Canyon Complex.<sup>15</sup> As part of the SRSP reporting protocols, IPC proposes annual updates on the progress of this study effort.

<sup>15</sup> As noted in the section on “toxics,” available water quality data indicate that water quality criteria contained in Table 30 for the protection of aquatic life are not currently exceeded within Brownlee Reservoir. However, if DEQ determines through the established adaptive management process that Plan B is required to attain and maintain compliance with applicable criteria, and implementation of Plan B

IPC proposes implementation milestones within 15 years and 30 years of FERC license issuance. Within 15 years of FERC license issuance, IPC proposes to have projects implemented to equal 50% of the cumulative thermal load exceedance. Within 30 years of FERC license issuance, IPC proposes to have projects implemented to equal to 100% of the applicable cumulative thermal load exceedance. The 5-year review statements will include an analysis and updated assessment of whether the program is on track to achieve compliance with the 15- and 30-year compliance targets. The five-year reports will include a discussion of any alternative or supplemental measures.

### **Brownlee Operational Component**

Temperature data collected in 2014 and 2015 demonstrated that there are periods at the onset of spawning when temperatures exceeded 17°C. IPC proposes measures referred to as the “Brownlee operational component,” which, along with the SRSP, IPC expects to address Project impacts to water temperature below the Hells Canyon dam.

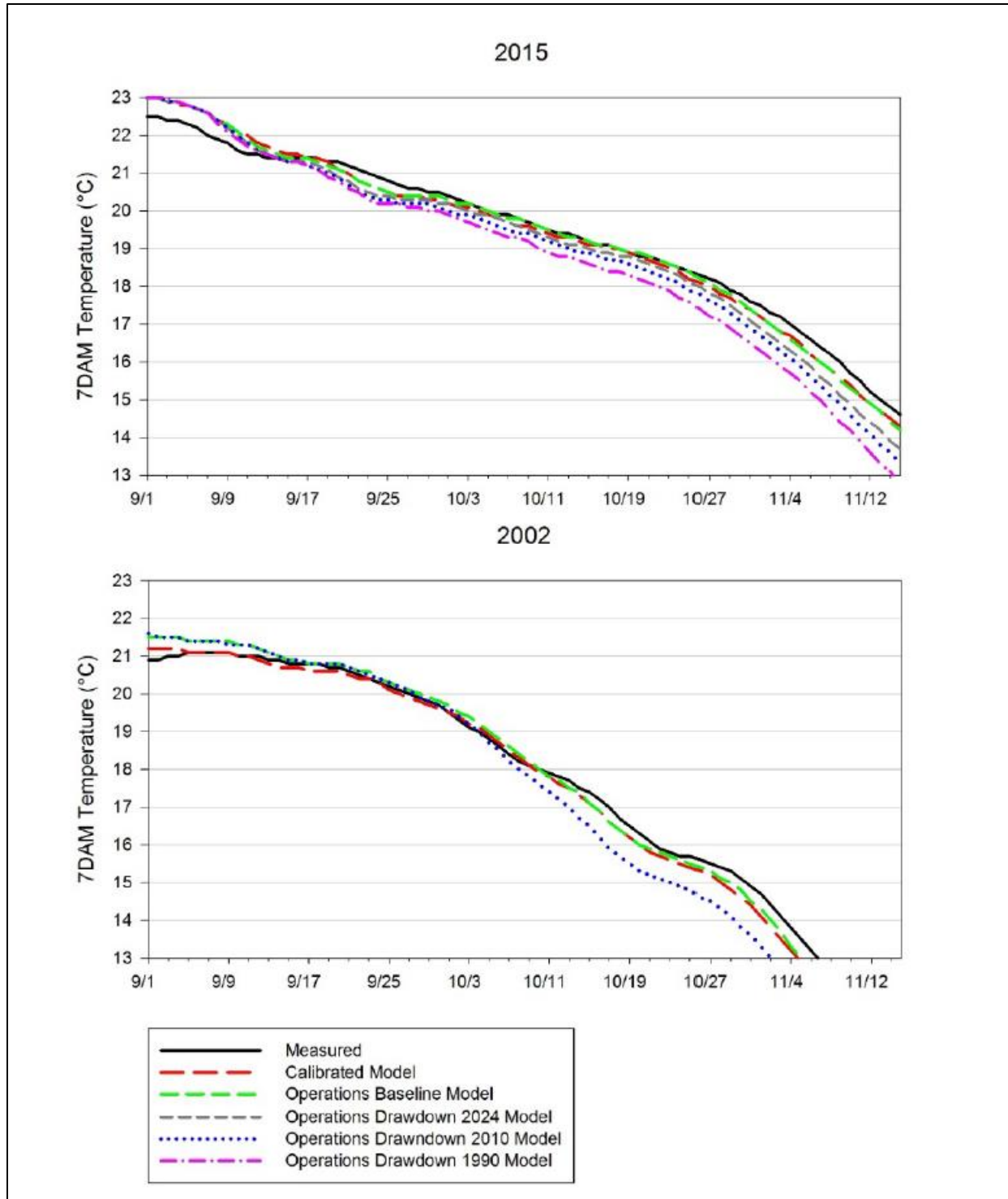
IPC defines the Brownlee operational component “to include changes in water management through changing flow regimes that are expected to effect changes to downstream water temperatures. At this time, IPC’s proposed Brownlee operational component is an enhanced fall drafting of Brownlee Reservoir in years when temperature at the beginning of the salmonid spawning period are forecast to have a high probability of exceeding 16.5°C” (Idaho Power Company, 2018)(page 157).

IPC proposes to forecast Hells Canyon Complex outflow 7 dAM temperatures and draft Brownlee reservoir. Drafting Brownlee reservoir to a lower elevation is effective in cooling outflow HCC temperature due to decreasing volume in the epilimnion. IPC notes “By decreasing the volume of the epilimnion the deeper draft reduces the residence time of the inflowing water, which is cooler during the fall, while at the same time reducing the volume of warm water within Brownlee Reservoir that needs to be cooled either from meteorological conditions or mixing with the inflow water” (Idaho Power Company, 2018)(Page 158).

IPC used the CE-QUAL-W2 model to develop the Brownlee operational component. IPC used the 2002 model and developed a 2015 model with recently collected outflow temperature data. The 2002 model and the 2015 model both represent low-water years during which the largest exceedances of the salmonid spawning criteria are typically measured. Using these two model years, IPC estimated the effectiveness of Brownlee drafting in low water years when warmer fall outflow temperatures are typical. IPC ran several operational scenarios with various fall drafts of Brownlee. Modeling results indicated that, compared to the operational baseline, HCC outflow temperatures began cooling in late September or early October and the cooling gradually increased until the end of the temperature exceedance period (Figure 19). IPC notes, “The deeper drafts of Brownlee resulted in modeled cooling at Hells Canyon outflow averaging 0.4 to 1.2°C during the period when baseline was above the salmonid spawning criterion” (Idaho Power Company, 2018)(Exhibit 7.1-1, Page 19).

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may have additional water quality impacts, including but not limited to potential increase in toxics, DEQ may require additional analysis. The primary concern is elevated concentrations of methyl mercury in fish tissue, in the water column in the hypolimnion of Brownlee Reservoir and the sediment near Brownlee Reservoir, as discussed later in this report.



**Figure 19: HCC outflow 7 dAM with Brownlee fall drawdown (IPC June 2018 application, Figure 7.1-2)**

As discussed above, IPC used the CE-QUAL-W2 model to simulate the effectiveness of drafting Brownlee to cool the outflow through the Oxbow and Hells Canyon Reservoirs to cool the Snake River downstream of Hells Canyon Complex. To implement the Brownlee operational component IPC will

forecast the HCC outflow temperature at the beginning of the salmonid spawning period. IPC proposes to use multiple regression modeling to estimate when there is a high probability that temperature will exceed 16.5°C in the beginning of the salmonid spawning period. IPC used their historic dataset of water quality, flow and operational conditions for HCC to evaluate statistical tools for forecasting. Based on this analysis IPC selected variables that were strongly correlated with HCC outflow 7 dAM temperatures on October 29. The variables included Brownlee inflow temperature, Brownlee inflow flow, Brownlee water surface elevation and air temperature (Idaho Power Company, 2018)(Exhibit 7.1-1, Page 25).

The goal will be to cool the HCC outflows to remain below 16.5°C as a 7dAM temperature during the salmonid spawning period. IPC proposes to draft Brownlee so that 16.5°C would not be exceeded, and if this should occur in any three consecutive year period despite implementation of these management actions, then alternative measures may be required.

As noted earlier IPC proposes two programs to address the exceedance of the spawning criterion at the discharge of Hells Canyon Complex: the Snake River Stewardship Program and the Brownlee Operational Component. To determine and quantify the Hells Canyon Complex cumulative thermal load exceedance, IPC conducted the following steps:

- For each year in the 27-year period (1991-2017), IPC calculated the amount, expressed in bkcal, by which the temperature of the water discharged at Hells Canyon Dam during the salmonid spawning period exceeds the 7dAM temperature criterion of 13.0°C, with the human use allowance of 0.3°C added. For each day of each year when the outflow temperature measurement exceeded the salmonid spawning criterion, IPC used measured flow data from the Hells Canyon Dam outflow to calculate a daily thermal load exceedance. For each of the 27 years of data analyzed, IPC combined the calculated daily values to get a cumulative thermal load exceedance for that year's spawning period, using the equation provided in the application (page 54). Table 6.1-4 and Exhibit 6.1-3 in the application summarize the results of this calculation.
- To incorporate the effects of the operational component, IPC adjusted the historic HCC outflow 7dAM temperature dataset based on an assessment of which years in the dataset the operational component would likely have been implemented. IPC then replaced the measured 7dAM temperature for those years in the historic dataset with the adjusted 7dAM temperatures based on cooling from the Brownlee operational component.
- IPC then calculated a revised cumulative thermal load exceedance using the adjusted data (Idaho Power Company, 2018)(Table 7.1-3, Page 165-166). The Snake River Stewardship Program addresses this thermal load obligation.
- Because the thermal load exceedance varied widely, IPC used the 90th percentile statistic to define its responsibility. Using this statistic results in a cumulative thermal load exceedance at the Hells Canyon Complex outflow of 541.6 bkcal. IPC provides justification for use of the 90<sup>th</sup> percentile in Exhibit 7.1-4.
- IPC applied a 10% margin of safety (54.2 bkcal), which increases the thermal load exceedance to 595.8 bkcal.
- IPC determined and applied a reservoir attenuation factor. This factor must be set to account for the loss of thermal benefits from upstream projects as the Snake River travels from the Brownlee inflow to the HCC outflow. Using results from 1992 and 2002 CE-QUAL-W2 reservoir model runs, IPC concluded that using an attenuation factor of 50% reasonably accounts for the attenuation of upstream benefits through the reservoirs. Section "7.1.2.2.4 Technical Information Relative to Attenuation and Thermal Benefit Aggregation Period" in the June 2018 application provides additional detail about this calculation. Applying this reservoir attenuation factor to the cumulative thermal load exceedance of 595.8 bkcal results in a cumulative thermal load reduction target of 1191.6 bkcal at the Hells Canyon Complex inflow.



- As IPC notes, “Similar to the need to address attenuation through the HCC reservoirs, there is also a need to address attenuation of thermal benefits from each project to the inflow to the HCC” (Idaho Power Company, 2018)(Page 168). IPC proposes to use one attenuation factor for tributary projects (25%) and a separate factor for in-river projects (22%). IPC reviewed existing modeling results to arrive at these factors. Section 7.1.2.2.4 of the June 2018 application provides details on the modeling review.
- IPC intends that the Snake River Stewardship Program projects offset the remaining cumulative thermal load exceedance by producing thermal benefits at many individual projects upstream. IPC proposes to add together all the thermal load benefits from the upstream projects.
- The last step is to determine the period that the SRSP projects will provide thermal benefits expected to influence the Hells Canyon Complex outflow during the fall spawning period. IPC used CE-QUAL-W2 modeling of inflow thermal load reductions during September and October and incrementally simulated additional thermal benefits through the prior months back to April. As IPC notes “These model runs show that July through October inflow best represents the make-up of thermal benefits realized at the HCD outflow during the salmonid spawning period. As a result, IPC is proposing that the thermal benefits provided by the SRSP measures during the period from July 1 through October 29 be summed and credited toward the offset of the remaining HCC outflow CTLE” (Idaho Power Company, 2018)(Page 169).

#### **Alternative Measures:**

IPC notes that at any time, IPC may propose alternative or supplemental measures that may provide or assist in providing reasonable assurance of compliance with State temperature standards.

DEQ finds that implementation of a “Plan B” is a requirement of 401 certification (e.g., adaptive management) in case IPC is unable to implement the required number of projects or it has failed to reach its compliance targets. For Plan B, IPC proposes the installation of a hypolimnetic pump system (HPS) in Brownlee Reservoir. The HPS design blends cooler water from the hypolimnion of the reservoir with warmer upper level waters. IPC reviewed data from 1991 through 2009 and used a flow-weighting analysis to evaluate whether sufficient cold-water volume exists in Brownlee Reservoir to meet the spawning criterion. Details of the flow-weighted analysis are included in Exhibit 7.1-8 of the June 2018 application for section 401 certification. Based on this analysis, IPC concluded there was a sufficient volume of cold water in Brownlee Reservoir in October to meet the salmonid spawning temperature criterion.

IPC notes, “Consideration of alternative or supplemental measures relative to Brownlee operational component would occur on a schedule dependent on the performance of that component in meeting the 16.5°C salmonid spawning period temperature goals” (Idaho Power Company, 2018)(Page 204). If water temperature data collected downstream of Hells Canyon Dam shows that temperatures during the spawning period exceeded 16.5°C for three consecutive years, IPC notes that the DEQs may require IPC to implement measures that will assist in achieving the goals of the Brownlee operational component. IPC may consider augmenting the Brownlee operational component with a small HPS system to maintain the spawning temperature below 16.5°C. IPC notes “Final design and installation of an alternative measure would be completed within a timeframe to ensure that temperatures do not exceed 16.5°C for more than 3 consecutive years” (Idaho Power Company, 2018)(Page 197).

#### **DEQ Evaluation and Findings:**

Current operation of the Project alters the natural hydrograph, which has an adverse effect on certain water quality parameters, including temperature. The Project as proposed will continue to exert a thermal impact downstream and within the Project area. However, modeling efforts demonstrate that IPC’s implementation of the proposed SRSP and Brownlee operational component will attain the temperature standard and otherwise offset this thermal impact, which in addition to the proposed adaptive

management processes provided for in certification conditions, provide reasonable assurance that no violation of applicable standards will occur.

### ***Salmon and Steelhead Spawning through Fry Emergence***

Available water quality data indicate that the temperature criterion of 13°C for the protection of Salmon and Steelhead Spawning through Fry Emergence beneficial use, at times, is exceeded below Hells Canyon Dam. IPC proposes the development and implementation of the SRSP and Brownlee operational component to offset the thermal load obligation for the spawning criterion.

DEQ and IDEQ consulted with IPC throughout the development of the June 2018 application for section 401 certification, including working directly with IPC on deriving calculations used in development of the SRSP; and reviewing and approving the methodology to calculate the thermal load exceedance obligation. DEQ concurs that the calculations used to determine IPC's thermal load exceedance obligation are reasonable for the following reasons:

- IPC proposes to use the 90% percentile thermal load obligation. The 90% value is used in other environmental analyses, as noted by IPC in Exhibit 7.1-4. DEQ analyzed the use of the 90% thermal load obligation and calculated similar values to the value proposed by IPC.
- IPC evaluated in-reservoir attenuation of upstream temperature improvements with a process-based model (CE-QUAL-W2) and a statistical model (multiple linear regressions). IPC evaluated in-river attenuation based on modeling with CE-Qual-W2 and a Boise River model developed by Portland State University. Section 7.1.2.2.4. of the June 2018 application discusses the modeling in detail. DEQ concurs that the models were appropriate tools to develop a simplified formulation to track the loss of thermal benefit from Marsing Reach to the outflow of Hells Canyon dam. DEQ notes that both the reservoir and riverine portion of this formulation were checked with independent tools. DEQ concurs this methodology is within the range of DEQ's typical analytic rigor for regulatory decisions of this type, because model comparison offered similar results.
- IPC evaluated the period to aggregate the SRSP project's thermal benefits using CE-Qual-W2. IPC proposed that thermal benefits provided by the SRSP measures during the period from July 1 through October 29 be summed and credited to offset the HCC outflow cumulative thermal load exceedance. DEQ concurs that upstream restoration would be expected to have a greater impact on inflow temperatures in July, August, and early September, with less impact in late September and October.

DEQ concurs that the estimates of thermal benefits from the in-stream and riparian projects are conservative for the following reasons:

- Current models to calculate temperature benefits are largely limited to the quantification of reduced thermal loading from the sun. Not all possible temperature benefits from the SRSP projects are presently quantifiable. For example, it is not currently possible to predict temperature changes due to increased hyporheic flow, instream flow augmentation or improved thermal buffering capacity in the river. These expected temperature benefits are not included in the estimate of potential thermal benefit supply provided in Table 33; therefore, the temperature benefits of SRSP projects are likely underestimated.
- DEQ concurs that a 10% margin of safety is appropriate and covers uncertainty related to the load calculation and DEQ agrees that the proposal's inclusion of this factor further establishes compliance with DEQ's Division 39 rules.

DEQ received several comments on the thermal benefit attenuation factors used by IPC. To clarify the attenuation requirements DEQ edited the water quality certification in Section II.C.1. The certification requires implementation of Exhibit 7.1-5 of IPC's June 2018 application for water quality certification, with the exception of language that incorrectly stated that attenuation at the project level was not required

to account for river attenuation. The bkal requirement at the project inflow includes attenuation through the reservoir. It does not include river attenuation.

DEQ concurs that the Brownlee Operational Component, with the SRSP, will address water temperature below the Hells Canyon dam in excess of 16.5°C for the following reasons:

- IPC provided technical information for the CE-QUAL-W2 model used to develop the Brownlee Operational Component.
- IPC provided DEQ with additional information on the estimation of variables in the multivariate linear regression model.
- DEQ found that the information on the CE-QUAL-W2 model and the multivariate linear regression model provided by IPC was reasonable.

#### ***Salmon and Steelhead Migration Corridor Use***

Project impoundments affect water temperatures in the Snake River, which in turn affects the survival, development, spawning success and outmigration timing of anadromous salmonids, among other fish and aquatic life. For example, water temperatures alterations modify developmental timing and outmigration of salmonids, adult migrations, fry emergence, and smoltification, as well as salmonid metabolism, growth rate, and disease resistance (U.S. Environmental Protection Agency, 2001)(page 113).

Based upon modeling efforts and literature review, DEQ expects the SRSP will address these factors by reducing temperature in the tributaries and main stem Snake River below the SRSP project locations. Reduced stream temperatures will reduce the stress on fish and aquatic life, thus, among other benefits, reducing susceptibility to fish pathogens.

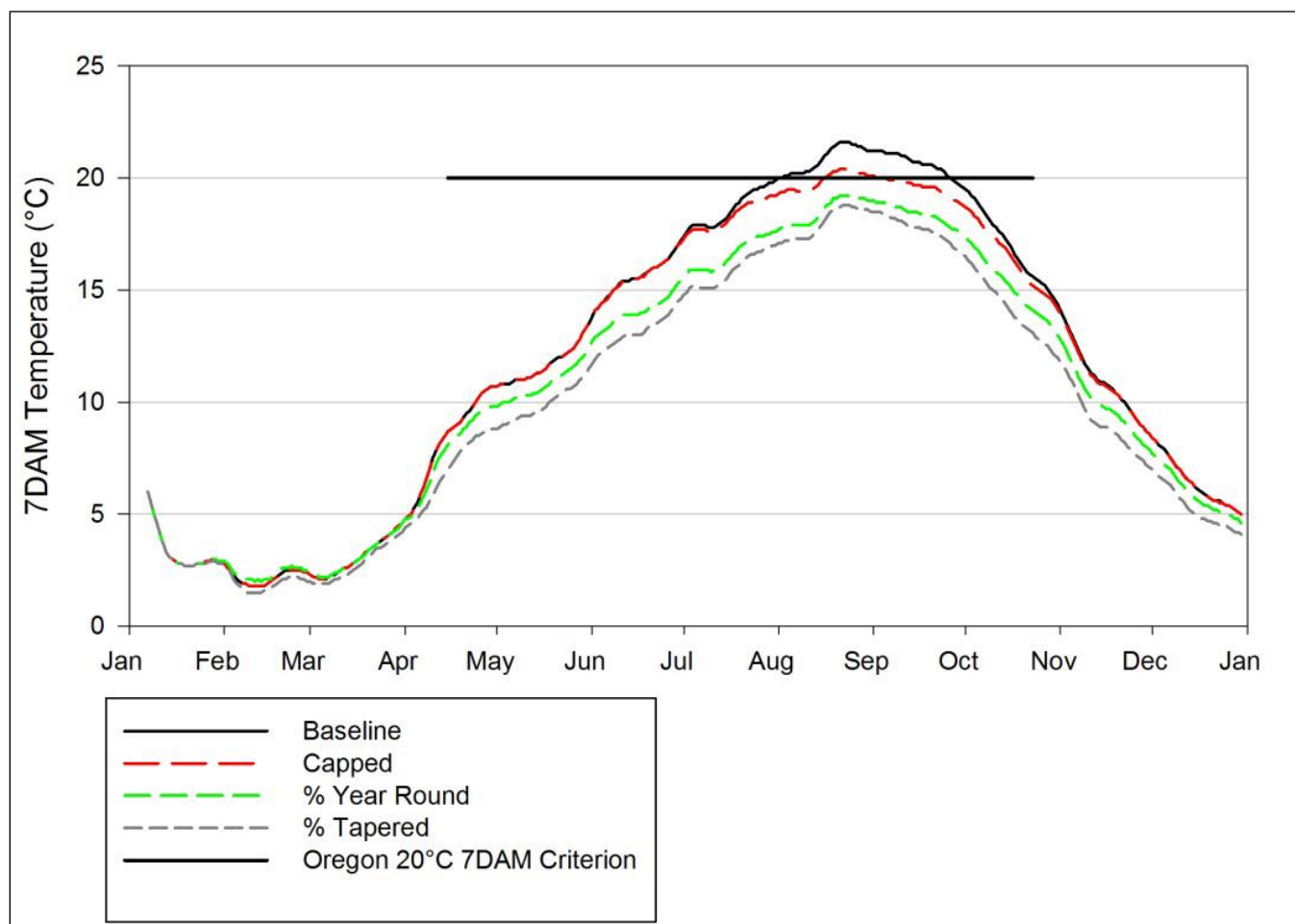
#### ***Biologically Based Numeric Criterion of 20°C***

Current temperature data indicates that neither the water flowing into the Hells Canyon Complex, nor the water flowing out of the Hells Canyon Complex is compliant with the 20°C criterion at all times.

IPC modeled the inflow and resulting outflow from the Hells Canyon Complex using the 2002 Hells Canyon Complex CE-QUAL-W2 model applications. DEQ has not modeled the Hells Canyon Complex using the CE-QUAL-W2 model developed by IPC. However, DEQ did request information about the model in an additional information request dated September 24, 2010. In its March 11, 2011 response, IPC provided model documentation and peer review information for the initial CE-QUAL-W2 models developed for the HCC. IPC provides the March 2011 response as Exhibit 7.1-10 in the June 2018 application.

IPC's analysis uses three assumptions to develop three separate inflow temperature conditions. IPC refers to the three inflow temperature conditions as "the Capped, % Year-Round, and % Tapered." The capped scenario is the most basic and simply caps the daily average inflow temperature at 19°C (which is IDEQ's more stringent criterion). The percentage year round scenario is "developed by calculating the percent reduction needed at the summer peak to meet the numeric criteria" (Idaho Power Company, 2018)(page 189). The third scenario applies the entire percent reduction at the peak; however, the percent reduction tapers off to zero at the beginning and end of the year (page 189). As seen in Figure 20, the modeling results indicate that when Hells Canyon Complex inflow temperature meets Idaho's 19°C daily average criterion, the Hells Canyon Complex outflow will attain Oregon's 20°C 7dAM criterion. Because DEQ previously evaluated CE-QUAL-W2 model documentation, DEQ concurs with this assessment. IPC's implementation of the SRSP will likely reduce stream temperatures entering the Project, which will then result in a reduction of temperatures downstream of the Project. Accordingly, implementation of the proposed SRSP, in combination with the Brownlee Operational Component, and proposed adaptive management processes provided for in certification conditions, provides reasonable assurance of compliance with the applicable biologically based numeric 20°C criterion.





**Figure 20: Modeled 7dAM HCC outflow temperatures with inflow at 19° C (IPC June 2018 application, Figure 7.1-15)**

#### *Natural Seasonal Thermal Pattern Supplemental Narrative Criterion*

This criterion protects the designated beneficial use of Salmon and Steelhead Migration Corridor Use in the main stem Columbia and Snake Rivers. The criterion supplements the biologically-based numeric criteria to acknowledge that significant thermal shifts in a water body's natural seasonal thermal pattern may impact this designated use even if the summer maximum numeric criterion of 20°C is not exceeded. The criterion requires that fall cooling and spring warming of river temperatures should not be significantly delayed because of the management of dams and reservoir releases.

DEQ finds that the natural seasonal thermal pattern of the Snake River does shift due to Project impoundments. Notably, the narrative criterion itself allows variation in thermal pattern to occur because natural patterns are highly variable, and impacts on designated uses are unlikely to occur absent significant modification to natural patterns. Fish, within limits, can demonstrate plasticity in their ability to adapt and function in variable thermal regimes. Accordingly, DEQ finds that here the Project-induced shift in the natural seasonal thermal pattern is sufficiently mitigated by implementation of the SRSP. For example, as seen in Figure 20, decreased inflow temperatures are expected to result in a decrease in the peak outflow temperatures. DEQ finds that implementation of the SRSP provides reasonable assurance of compliance with the NSTP narrative criterion because the reduction in peak temperatures that will occur

as a result of SRSP implementation will likely reduce stress on all fish and aquatic life, and improve the likelihood that these species will tolerate the Project-induced variability in thermal pattern. Further, the presence of cold-water refugia downstream of the Project will continue to improve migration conditions.

*Cold Water Refugia Supplemental Narrative Criterion*

DEQ agrees that temperature data for several tributaries to the main stem Snake River, at river miles 190 – 206, establish that at present sufficient cold-water refugia exists below the Hells Canyon Complex. As seen in Figure 17, the tributaries provide at least 2°C cooler water than the main stem Snake River, except during mid-July. Further, additional data for tributaries entering the Snake River at river miles 220-247 is provided in Exhibit 6.1-1 of the June 2018 application and all of these tributaries provided at water that was at least 2°C cooler than the Snake River at river mile 247.8.

In conclusion, the DEQ finds that the specificity of reporting and monitoring in the SRSP and implementation of the Brownlee operational component, in combination with an identified corrective action (Plan B) triggered should the required number of projects fail to be achieved by year 15 or the temperature below Hells Canyon dam exceeds 16.5°C three years in a row, will collectively prevent any serious damage to existing uses before such would occur. Accordingly, the DEQ is reasonably assured that Project operation under a new FERC license will comply with the temperature criteria provided IPC complies with the certifications conditions, including but not limited to the following measures generally described below:

- Implementation of the SRSP (Trading Plan) and;
- Attainment of the 15 year and 30 year thermal load reductions;
- Completion of yearly progress reporting as proposed in the June 2018 application for 401 certification, Section 7.1.2.3.5 and in compliance with OAR 340-039-0017(3);
- Submission of progress report every five years as proposed in the June 2018 application for 401 certification, Section 7.1.2.3.5 and in compliance with OAR 340-039-0025;
- Temperature monitoring above, within and below the Hells Canyon Complex.
- If the results of the second 5-year report indicate that the 15 and 30-year implementation milestone will not be met, and adequate corrective actions aren't proposed and approved by DEQ, IPC will develop an alternative measures plan;
- Implementation of the Brownlee Operational Component as proposed in the June 2018 application for 401 certification, Section 7.1.2.1;
- If the results of temperature data collection below the Hells Canyon Complex indicate 16.5°C is not met for three consecutive years, IPC will develop an alternative measures plan;
- Implementation of Plan B, if required by DEQ, to prevent exceedance of water quality standards.

## **7.2.4 Oil and Grease:**

### **340-041-0007**

#### **Statewide Narrative Criteria**

(12) Objectionable discoloration, scum, oily sheens, or floating solids, or coating of aquatic life with oil films may not be allowed;

IPC has a National Pollutant Discharge Elimination System (NPDES) permit for the Hells Canyon dam and power facility (DEQ file number 41297, EPA permit number OR-002727-8). The permit contains limits for oil and grease of 10 mg/L. The limit applies to outfalls 001-003 for non-contact cooling water and outfall 004 for sump wastewater.

IPC has a NPDES permit for the Oxbow Dam power plant (DEQ file number 41299. EPA permit number OR 002728-6). The permit contains limits for oil and grease of 10 mg/L. The limit applies to outfalls 001-004 for non-contact cooling water and outfall 005 for sump wastewater.

**DEQ Findings:**

DEQ is reasonably assured that the narrative criterion to protect against oily sheens will not be violated as long as IPC remains in compliance with the oil and grease limits in the NPDES permits.

**7.2.5 Total Dissolved Gas:**

Oregon's water quality standards address total dissolved gas in Division 041, section 0031 as follows:

**OAR 340-041-0031**

**Total Dissolved Gas**

(1) Waters will be free from dissolved gases, such as carbon dioxide hydrogen sulfide, or other gases, in sufficient quantities to cause objectionable odors or to be deleterious to fish or other aquatic life, navigation, recreation, or other reasonable uses made of such water.

(2) Except when stream flow exceeds the ten-year, seven-day average flood, the concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection may not exceed 110 percent of saturation. However, in hatchery-receiving waters and other waters of less than two feet in depth, the concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection may not exceed 105 percent of saturation.

Water spilled over the spillway of a dam entrains air bubbles. When the bubbles are carried to depth in the dam's stilling basin, the higher hydrostatic pressure forces air from the bubbles into solution. The result is water supersaturated with dissolved nitrogen, oxygen, and the other constituents of air, known as total dissolved gas. Fish in this water may not display signs of difficulty if the higher water pressures at depth offset high total dissolved gas pressure passing through the gills into the blood stream. However, if the fish inhabit supersaturated water for extended periods, or rise in the water column to a lower water pressure at shallower depths, TDG may come out of solution within the fish, forming bubbles in their body tissues. This gives rise to gas bubble trauma, which can be lethal at high levels, or give rise to chronic impairment at lower levels. There is extensive research reported in the literature on the forms of physical damage to fish that represent the symptoms of gas bubble trauma. (Total Maximum Daily Load (TMDL) for Lower Columbia River Total Dissolved Gas, September 2002 Prepared jointly by the Oregon Department of Environmental Quality and the Washington State Department of Ecology, from abstract).

**Current water quality status**

IPC notes that spilling at the project is usually involuntary; spilling usually occurs because of flood-control constraints or high-runoff events. Spilling typically occurs between December and July in higher water years when Snake River flows exceed the project's flood-storage capacity, as mandated by the USACE, or the hydraulic capacity of generation turbines. IPC notes that other unusual situations, including emergencies or unexpected unit outages, can induce a spill episode at any of the projects.

Spilling water at any of the three dams within the project can increase TDG to super saturation levels that exceed the 110% of saturation criterion. IPC measured TDG levels measured immediately downstream of the spillway at Brownlee Dam. As seen in Figure 21 below, during spills above 3,000 cubic feet per second at Brownlee Dam, TDG levels in spilled water consistently exceeded the 110% of saturation criterion and were measured as high as 128%.

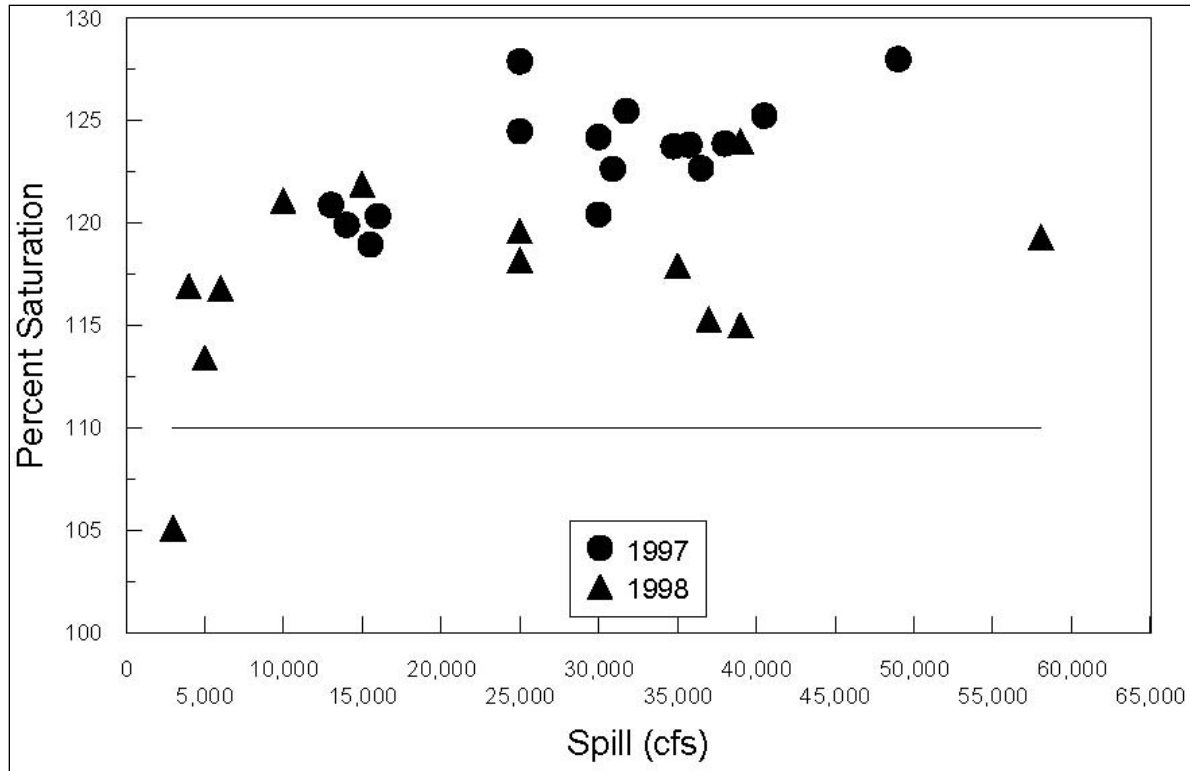


Figure 21: Relationship between spill and TDG, downstream of Brownlee Dam, 1997-1998, (IPC June 2018 401 application Figure 6.3-1)

TDG levels measured in the spill of Oxbow Dam were similar to those measured in the spill of Brownlee Dam and exceeded the criterion (Figure 22). In 1997 and 1998, the TDG levels measured at Oxbow Dam did not necessarily represent independent Oxbow Dam spill events, because water was also spilling at Brownlee Dam. TDG levels in Oxbow Reservoir reached 125% of saturation.

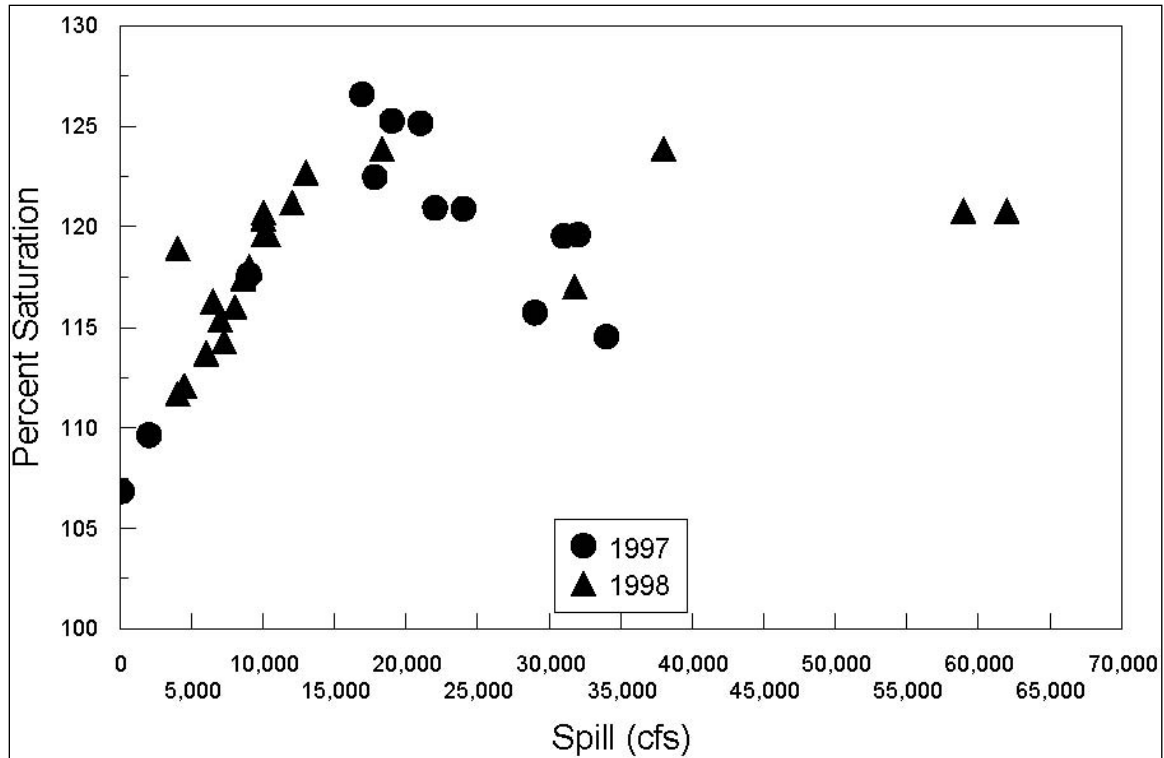


Figure 22: Relationship between spill and TDG measured downstream of Oxbow Dam, 1997-1998 (IPC Jun e2018 401 application Figure 6.3-2)

Monitoring conducted by IPC in 2006 allowed an evaluation of spill at Oxbow Dam independent of Brownlee Dam spill (i.e., when Oxbow Reservoir forebay TDG levels were less than 110% of saturation). These data showed that when the Oxbow Reservoir forebay was below the criterion, spill at Oxbow Dam increased TDG levels to approximately 128% of saturation in the bypassed reach (Figure 23).

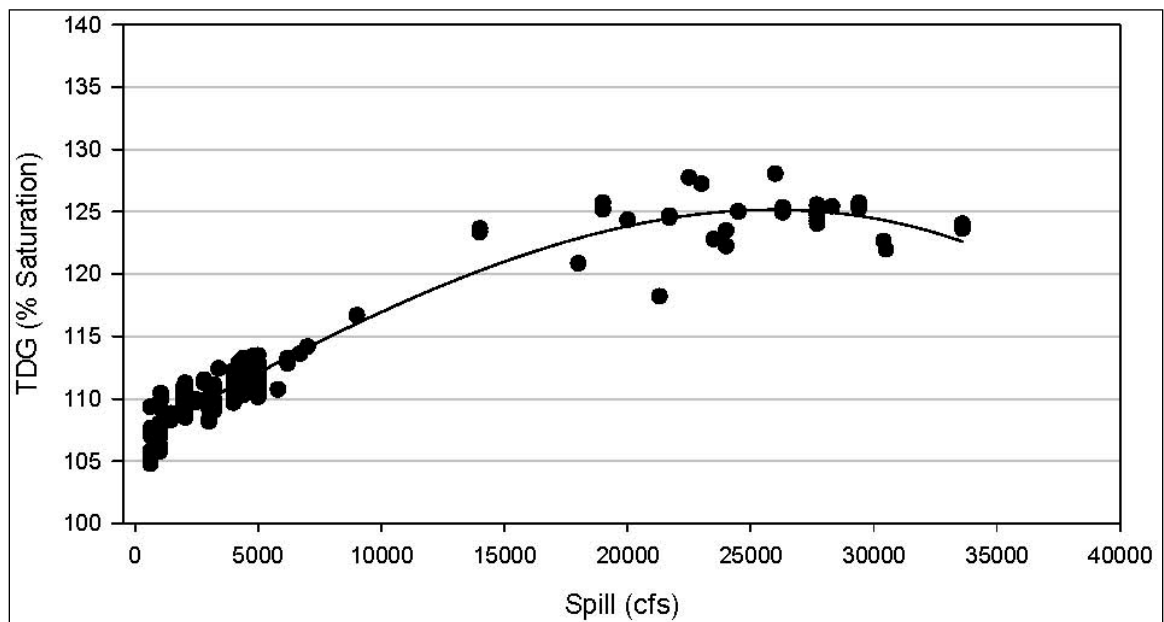


Figure 23: Relationship between spill and TDG at Oxbow dam. (IPC June 2018 application Figure 6.3-4)

TDG data collected in 1997 and 1998 at the Hells Canyon boat launch ranged up to 133% of saturation, as seen in Figure 24. IPC notes that super saturation declined in the Snake River as water flowed downstream of HCD (Figure 25). Levels in excess of 110% of saturation persisted downstream to the confluence with the Salmon River (RM 188) when spilling approximately 20,000 cubic feet per second or greater at Hells Canyon Dam.

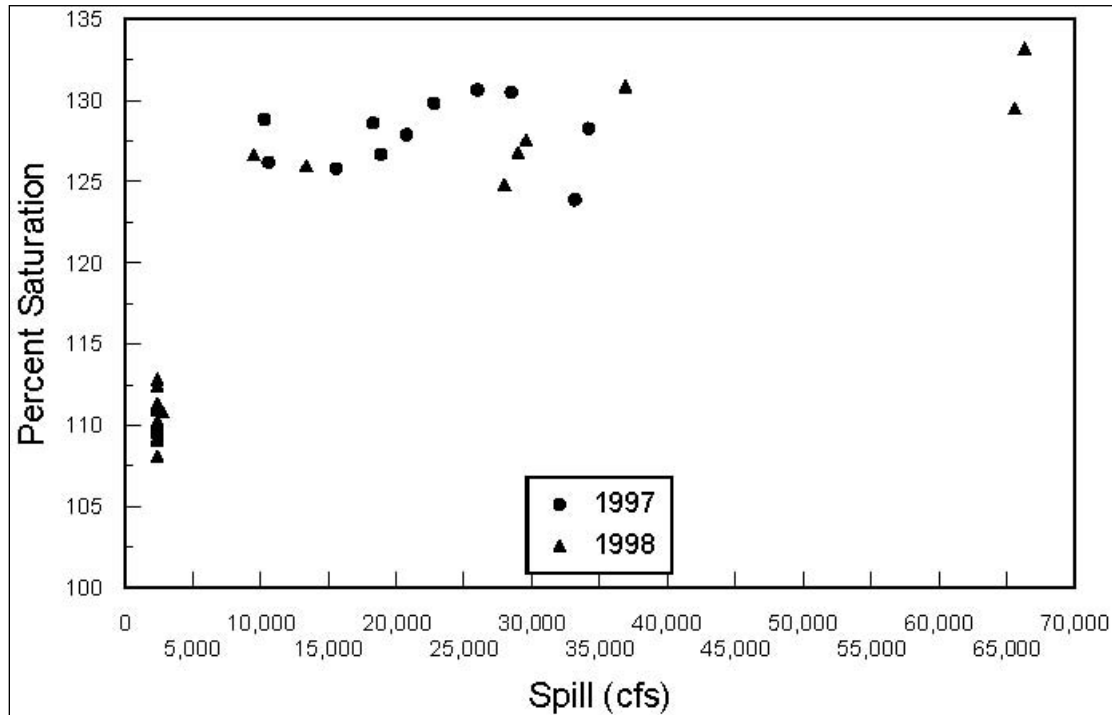


Figure 24: Relationship between spill and TDG downstream of Hells Canyon Dam. (IPC June 2018 application, Figure 6.3-5)

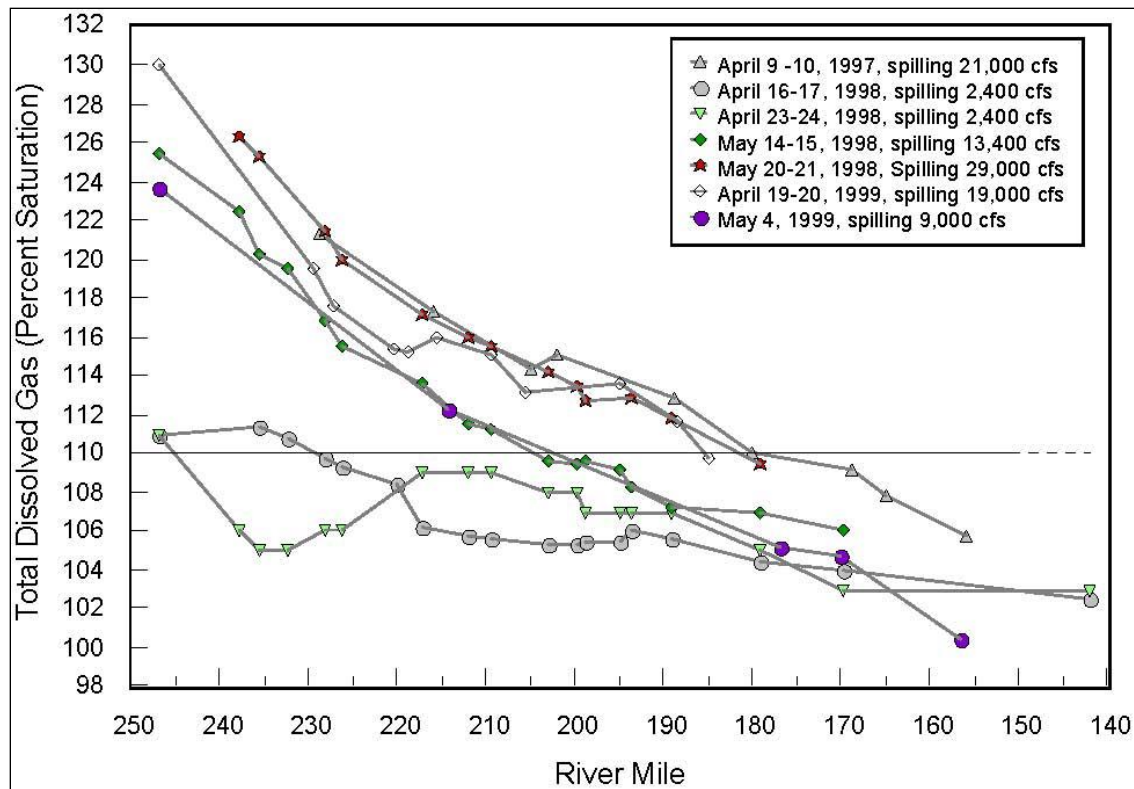


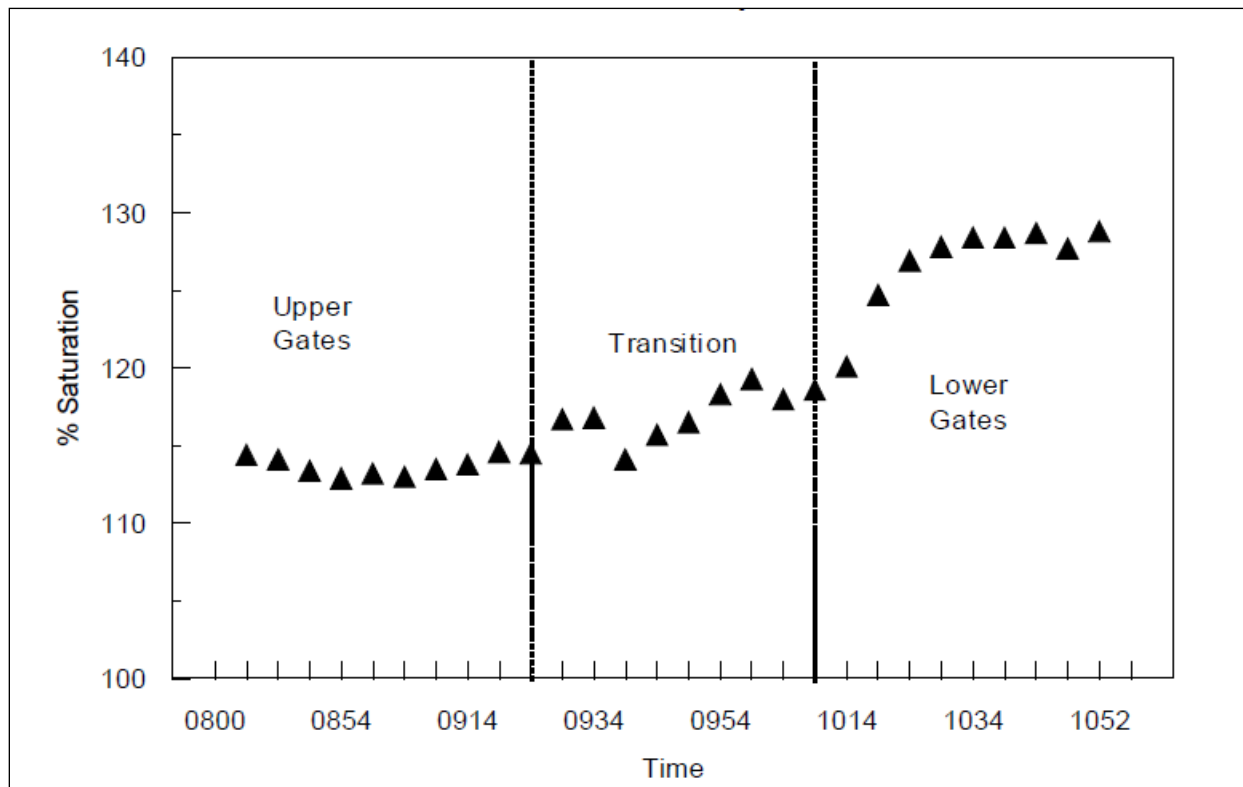
Figure 25: TDG levels downstream of Hells Canyon dam. (IPC June 2018 application, Figure 6.3-7)

#### Applicant's proposed measures:

IPC evaluated the use of flow deflectors using 3 D physical models (for HCD and Brownlee dam) and a hydraulic model for Oxbow dam. IPC proposes to conduct monitoring to evaluate compliance with the TDG criterion. Additionally, IPC proposes to evaluate additional measures to attain the TDG criterion, as necessary. Specifically, IPC proposes an adaptive management approach to address TDG levels through and below the Hells Canyon complex. The adaptive management approach includes measures to address TDG, monitoring to ensure compliance with the TDG criterion, and evaluation and implementation of additional measures if the proposed measures do not result in attainment of the TDG criterion. The proposed measures include: (1) the continued preferential spilling of water through the Brownlee Dam upper spill gates as an early implementation measure, (2) the installation of HCD sluiceway flow deflectors, (3) the installation of Brownlee Dam spillway flow deflectors, (4) the installation of a spillway flow deflector at Oxbow Dam, (5) monitoring during spill events to provide data for use in final flow deflector designs and (6) development of a monitoring plan with specific compliance monitoring locations and monitoring protocols. Each proposed measure is discussed in more detail below. IPC has proposed several additional measures for DEQ's evaluation that may be required if the Project, despite IPC's proposed actions, still causes exceedances of the TDG criterion.

IPC proposes to continue the current practice of preferentially spilling water from the Brownlee Dam upper spillway gates. IPC notes that spill test data were collected at Brownlee Dam during a single test conducted on June 4, 1998. The test was conducted while spilling water at 39,000 cubic feet per second. IPC's analysis of these data indicated TDG levels from the Brownlee Dam upper gate spill were statistically lower ( $P = <0.001$ ) when compared to TDG levels from the lower gate spill. Figure 26 shows that TDG levels downstream of Brownlee Dam averaged 114% of saturation while spilling from the upper gates and increased during transition to spilling through the lower gates, resulting in an average TDG level of approximately 128% of saturation. IPC's evaluation of Brownlee Dam spill test data indicated that upper gate spill resulted in lower TDG levels. While preferential spill alone will not result

in attainment of the TDG criterion, IPC notes that the measure will minimize TDG levels to the extent possible until spillway flow deflectors are installed at Brownlee Dam.



**Figure 26: TDG below Brownlee dam during operation of the upper and lower spill gates (IPC June 2018 application, 7.3-11)**

IPC notes that flow deflectors are the best available technology for reducing elevated TDG levels at hydroelectric projects in the Northwest. IPC states “The US Army Corps of Engineers has performed most of the research relevant to flow-deflector design, physical model studies, and initial prototype testing. The USACE evaluated numerous alternatives and concluded the best options to reduce TDG levels are to structurally modify the dam to either reduce the volume of air entrained in the water column or to reduce the hydrostatic pressures that act on entrained air by keeping entrained air near the surface” (Idaho Power Company, 2018) (page 246). Additionally IPC notes “The USACE concluded the 3 most feasible alternatives for most large river dams are 1) submerged spillway conduits, 2) spillway deflectors, and 3) new spillway-gate types or openings. Of these alternatives, the installation of spillway deflectors appears the best available technology for most dams” (Idaho Power Company, 2018)(page 247).

IPC proposes to install Hells Canyon Dam sluiceway flow deflectors to attain the TDG criterion. The spillway deflectors are designed to redirect plunging spillway jets, reducing total dissolved gas (TDG) produced by spill discharges (Idaho Power Company, 2018)(Exhibit 7.3-1, Page ii). Implementation will occur consistent with the schedule in the new FERC HCC license. IPC notes that FERC’s required design review process and permitting requirements could be completed within one to two years after the new license issuance. The construction and installation of the flow deflectors would occur serially during the following 2 years.

IPC proposes to install Brownlee Dam spillway flow deflectors to attain the TDG criterion at Brownlee Dam. Construction and installation will occur consistent with the schedule in the new FERC HCC license. IPC notes, “This tentatively schedules operational Brownlee Dam spillway flow deflectors following the



sixth year after the new license issuance” (Idaho Power Company, 2018)(Page 252). Until deflector installation, IPC will preferentially spill from the Brownlee Dam upper spillway gates as an early implementation measure.

IPC proposes to install an Oxbow Dam spillway flow deflector to reduce TDG levels. IPC proposes to optimize the Oxbow Dam spillway flow deflector and complete the final engineering design within one year of initiating the construction and installation of the Brownlee Dam spillway flow deflectors. IPC notes that Brownlee Dam TDG levels influence Oxbow Dam TDG levels, so it may be necessary to monitor the effectiveness of the Brownlee Dam spillway flow deflectors before developing a model to optimize the Oxbow Dam spillway flow-deflector final design. (Idaho Power Company, 2018)(Page 252). IPC will construct and install the Oxbow Dam spillway flow deflector consistent with the schedule in the new FERC Hells Canyon Complex license that incorporates FERC’s required design review process. IPC notes that this tentatively schedules the Oxbow Dam spill flow deflector to be operational following the ninth year after the new license issuance.

IPC proposes to work with DEQ and IDEQ develop a TDG monitoring plan. The plan will include specific locations to define the edge of the aerated zone below each project and a specific methodology for monitoring during spill, including equipment and the need to evaluate additional measures. IPC notes that additional monitoring may be needed to collect data necessary to run a model to finalize flow-deflector designs. IPC will coordinate with the DEQ and IDEQ, as much as practicable, to develop these methods.

In the application for certification (Idaho Power Company, 2018) (pg. 245), IPC describes several additional measures that may be evaluated and required if implementation of the proposed measures does not prevent exceedance of the TDG criterion.

**DEQ Evaluation and Findings:**

IPC evaluated the use of flow deflectors using 3 D physical models for HCD and Brownlee dam. These models were built to scale and allowed IPC to evaluate measures directly, in a laboratory simulation. IPC used a hydraulic model for Oxbow dam. In all three simulations, IPC evaluated structural changes to the dams. As discussed earlier, USACE recommends structurally modifying dams to address TDG levels. IPC proposes to use one of the most feasible alternatives: spillway deflectors. DEQ concurs that IPC’s proposal to modify dam structure follows recommendations from USACE. Until the structural changes are complete, IPC proposes to spill from the upper gates, which decreases the average TDG level. DEQ concurs that preferential spilling from the upper gates will result in lower TDG levels and reduce the deleterious effects on fish. IPC proposes to conduct monitoring to evaluate compliance with the TDG criterion. Additionally, IPC proposes to evaluate additional measures to attain the TDG criterion, as necessary. DEQ concurs that monitoring following construction will allow IPC to evaluate the effectiveness of the changes and that the results cannot be known without monitoring. IPC proposes several additional measures to address TDG, if the flow deflectors do not result in attainment of the TDG criterion. The additional measures include structural changes to the dams, which follows the USACE recommendations.

DEQ is reasonably assured that Project operation under a new FERC license will comply with the TDG criterion provided the following measures be implemented:

- IPC continues preferential Brownlee dam upper gate spill until the flow deflectors are installed and operating.
- Development of an Operating Plan that includes the proposed schedule for the submittal for approval of the design plans to FERC;

- Installation of flow deflectors at the Brownlee Dam spillway, the Oxbow Dam spillway and the Hells Canyon sluiceway;
- Development and implementation of a monitoring plan to determine whether the system is meeting the applicable criteria;
- Evaluation and implementation of the alternative measures described in the approved Operating Plan.
- Implementation of alternative measures, as needed.

## 7.2.6 Harmful Algal Blooms:

Oregon's water quality standards do not specifically address harmful algal blooms (HABs), but language in the narrative criteria address conditions that may result from HABs, as described below:

### **OAR 340-041-0007**

#### **Statewide Narrative Criteria**

- (10) The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish may not be allowed;
- (12) Objectionable discoloration, scum, oily sheens, or floating solids, or coating of aquatic life with oil films may not be allowed;
- (13) Aesthetic conditions offensive to the human senses of sight, taste, smell, or touch may not be allowed.

A harmful algae bloom can occur when certain types of microscopic algae grow quickly in water, forming visible patches that may harm the health of the environment, plants, or animals. HABs are most often caused by cyanobacteria. Cyanobacteria are a type of photosynthetic bacteria commonly referred to as blue green algae. Cyanobacteria can grow as single-celled organisms, as a colony that may look like strands, or bunched together in mats or spherical clusters. Like many bacteria, some cyanobacteria can produce toxins that are harmful to humans, pets, livestock and wildlife. When cyanobacteria begin to grow rapidly (when nutrients, temperature, pH and light are conducive to good growth) a cyanobacteria bloom can result. Hydroelectric projects may affect reservoir retention time and water quality, including nutrient cycling. This influence can contribute to cyanobacteria growth. The blooms can appear as visible green, blue-green or reddish brown foam, scum or mats that float on or near the water surface. Not all blooms are harmful, but some species of cyanobacteria can produce toxins that can cause serious illness or death in pets, livestock and wildlife. These toxins can also make people sick and in sensitive individuals cause a rash or irritation.

#### **Current Water Quality Status**

Algae samples have been collected on the Snake River from the upper Snake River segment (RM 409 to 335) through the Hells Canyon Reservoir (RM 249). The upper segment contains a mix of diatoms and blue green algae. The populations depend on "the season, water quality, and water temperature" (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(page 121). The algal populations change within Brownlee reservoir based on location. According to the Snake River Hells Canyon TMDL, "The algal populations within the reservoir change from upstream to downstream reservoir segments. The riverine zone in Brownlee Reservoir, with faster moving water and less stratification provides more favorable conditions for diatom species than for blue-greens, which is similar to the upstream Snake River segment (RM 409 to 335). When the water enters the lacustrine section of the reservoir however, cyanobacteria (blue-green algae) become more prevalent due to high inflowing nutrient levels and slower water velocities" (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(page 156). Data collected during a major algal bloom in 1992 in the

Snake River between RM 396 and RM 310 showed that “the major types of algae present in the upstream Snake River segment were cyanobacteria species (*Microcystis aeruginosa*, and *Aphanizomenon flos-aquae*). The algal population in the lower sections of the river was almost exclusively *Anabaena spiroides* (99%), also cyanobacteria” (Oregon Department of Environmental Quality and Idaho Department of Environmental, 2004)(page 286). Idaho Power Company sampled the Hells Canyon Complex reservoirs in 1991, 1993 and 1994. These data indicate that the green algae dominate the upper end of Brownlee Reservoir. The middle segment of Brownlee Reservoir showed a mixture of blue-green and green species. Phytoplankton species in the lower segment of Brownlee Reservoir, and the Oxbow and Hells Canyon reservoirs were dominated by cyanobacteria species (Snake River Hells Canyon TMDL, page 286).

IPC notes, “High densities of blue-green algae were measured in Brownlee Reservoir at RM 285 and RM 290 during August 1991 and again in Brownlee Reservoir at RM 320 and in Hells Canyon Reservoir at RM 249 during the summer of 1993 and 1994. In the fall, a general assemblage shift back to Chrysophyta taxa was observed throughout the HCC, with the highest densities in the upper section of Brownlee Reservoir. However, blue-green algae still were dominant lower in Brownlee Reservoir at RM 312 and RM 302” (Idaho Power Company, 2018)(Page 117).

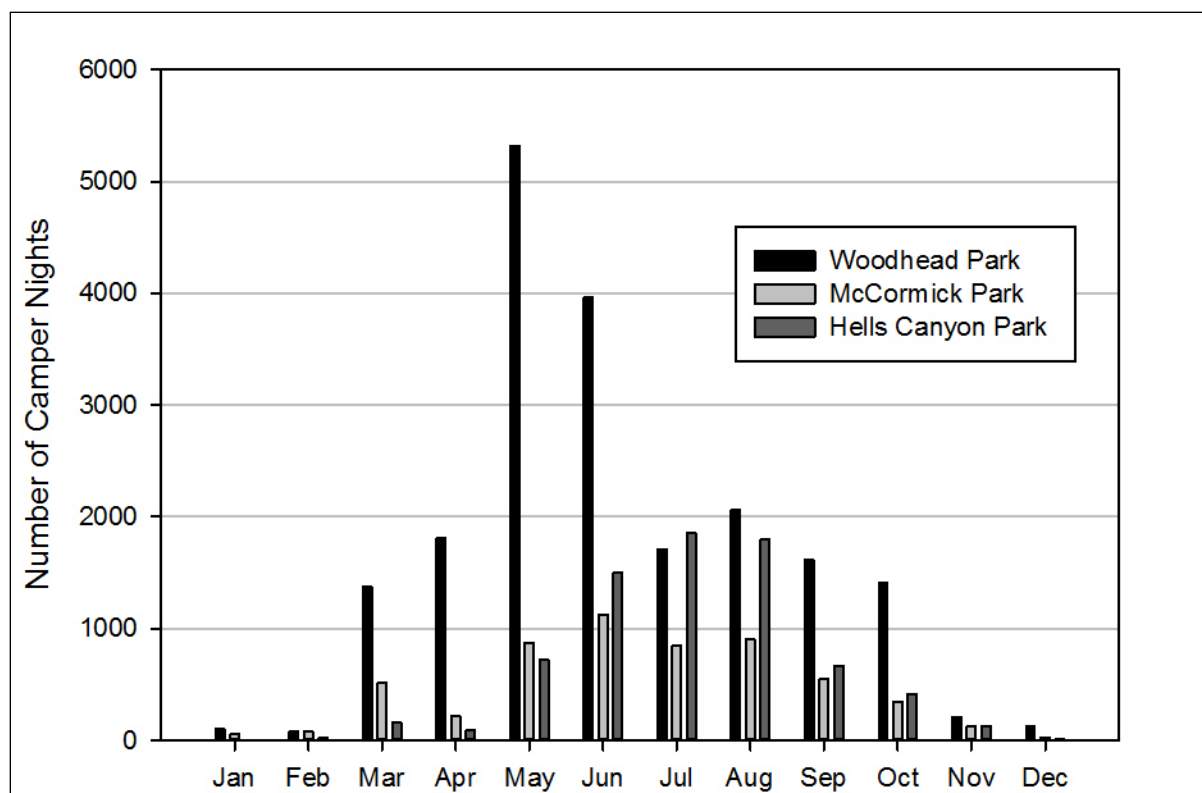
IPC enumerated algal cell density data in the Hells Canyon Complex during 1993 and 1994. Table 6.4-3 of the June 14, 2018 application for Section 401 certification IPC notes, “Data indicate there is risk of HABs occurring throughout the HCC during the summer and into the fall in Brownlee Reservoir” (Idaho Power Company, 2018)(Page 118).

In Table 6.4-3 of the June 14, 2018 section 401 application, IPC listed a result of “zero” for many cell density results. According to the technical appendix to the Final License Application, the counted samples were sub-samples. DEQ notes that species that were not detected should not be summarized as “zero” but should be summarized as non-detect. IPC also notes that HABs were observed in both Brownlee and Hells Canyon reservoirs during the summer of 2016 and in Brownlee Reservoir in 2017. IPC notes “*Aphanizomenon*, *Lyngbya*, and *Microcystis* were the dominant genera in 2016. Both cell counts and the concentration of the toxin *Microcystin* were the basis for the health alert. *Microcystis flos aqua* was the dominant taxon in 2017 (Idaho Power Company, 2018)(Page 118).

**Applicant’s proposed measures:**

IPC proposes to work with DEQ and IDEQ to develop a HAB monitoring plan. The Oregon Public Health Division of the Oregon Health Authority (OHA) collects and reviews information on harmful algae blooms, and informs the public through the issuing and lifting of advisories when data warrants. The plan will include monitoring protocol, sampling locations, and sampling frequencies, as well as specific reporting requirements to the Oregon Health Authority and Idaho Department of Health and Welfare (IDHW), including any additional sampling following the issuance of public health advisories. IPC proposes to focus monitoring primarily on the protection of human health and secondarily on the health of pets and livestock. IPC proposes that monitoring, at a minimum, will consist of periodic visual assessments of HAB status, such as areas of discoloration or surface scum collection, during peak recreational periods.

Figure 27 provides an index of recreational use throughout the HCC in 2013. IPC proposes to photograph potential HABs and, as needed collect surface grab samples when a potential HAB (e.g., surface scum) is encountered for species identification, enumeration testing for relevant toxins. IPC will notify the OHA and IDHW of any potential HAB and provide the monitoring results. IPC also proposes to adaptively manage HAB monitoring in the Hells Canyon Complex. IPC notes, “IPC may evaluate large geographic surveillance and alert methods to identify blooms as they develop allowing for early public alerts” (Idaho Power Company, 2018)(Page 253). IPC proposes to evaluate monitoring results every five years and may request to modify or terminate HAB monitoring.



**Figure 27: Index of recreational use in the HCC during 2013 (June 2018 IPC application, Figure 7.4-1)**

IPC proposes to finalize a monitoring plan within 1 year of initiation of consultation. IPC will file the monitoring plan immediately following the issuance of the new HCC license from FERC for approval. Monitoring for HABs will begin immediately following FERC approval.

#### **DEQ Evaluation and Findings:**

On July 25, 2018, Southwest District Health issued a health alert due to the presence of a harmful algal bloom in the Brownlee Reservoir from the Spring Recreation Site near Huntington, Oregon to Brownlee Dam. SWDH noted, “Recent samples taken indicate high concentrations of toxin producing cyanobacteria (sometimes referred to as blue-green algae) are present and may cause illness to humans and animals.<sup>16</sup>” Similar advisories were issued for Brownlee Reservoir in 2016 and 2017.

Discussions with OHA indicate that previous data cannot be used to predict future conditions. DEQ will require monitoring for HABs for the FERC license term.

Based on conversations with OHA staff, DEQ will require at least weekly visual monitoring. According to OHA, blooms can grow exponentially in one day. Monthly visual assessments may not be frequent enough to assess the potential development of HABs<sup>17</sup>. In response to public comment, DEQ edited the evaluation report to require monitoring at locations of high recreational activity and any other location identified by the DEQs.

<sup>16</sup> Downloaded on 11/15/2018 from Southwest District Health Website: <https://phd3.idaho.gov/category/health-alert/>.

<sup>17</sup> Phone call between Marilyn Fonseca, DEQ and Rebecca Hillwig, OHA, 11/16/15.

IPC also proposes to evaluate monitoring results after 5 years and may request the modification or termination of some or all of the monitoring described in the HAB monitoring plan. According to OHA staff, some genera are nitrogen fixers and can uptake nitrogen after other genera die off<sup>18</sup>. Because the genera may change over time, previous HAB monitoring may not be predictive of future monitoring results. In response to public comment, DEQ edited the certification to require review of the monitoring plans at least once every five years. DEQ concurs that reviewing the monitoring results more frequently is appropriate, as new methods for visual assessment and monitoring are developed.

IPC proposes to focus monitoring primarily on the protection of human health. DEQ concurs with this priority, because while OHA has developed dog-specific guideline values, they are for informational purposes only and are not used as a basis for issuing public health advisories.

DEQ is reasonably assured that development and implementation of a HAB monitoring plan will provide information to the OHA so that OHA may issue advisories “to help to inform the public of the health risks associated with exposure to potentially toxic cyanobacteria in Oregon’s recreational fresh waters” (Oregon Health Authority, 2018)(Page 3). DEQ is reasonably assured that Project operation under a new FERC license will inform public health protection provided IPC implement the following measures:

- Within 90 days of issuance of the FERC license, submission to DEQ of a HAB monitoring plan. Minimum plan components will include:
  - Identification of locations of high recreational activity and at any other location identified by DEQ, throughout the Hells Canyon Complex.
  - A minimum of visual monitoring every week during high recreation periods.
  - Additional monitoring based on results of visual monitoring and reporting of results to the OHA.
  - Advisory postings at the sampling locations following issuance of an advisory by OHA.
  - Monitoring will follow OHA guidelines. (Oregon Health Authority, 2018) DEQ will work with OHA on review of the monitoring plan.
- Implementation of the HAB monitoring plan following DEQ review and approval.
- Review of monitoring results every five years.
- Updates to the monitoring plan, at least every five years, if needed, to reflect new versions of OHA guidance documents.
- Submit updated monitoring plans to DEQ for review and approval.

### 7.2.7 Mercury (Hg):

The applicable numeric criteria for the protection of aquatic life are presented in Table 30 of Oregon’s water quality standards and in Table 40 for the protection of human health.

**Table 30 Aquatic Life Water Quality Criteria for Toxic Pollutants  
OAR 340-041-8033**

Pollutant	Freshwater Criteria (ug/L)	
	Acute Criterion (CMC)	Chronic Criterion (CCC)
<b>Mercury (total)</b>	2.4	0.012

<sup>18</sup> Ibid.

**Table 40 Human Health Water Quality Criteria for Toxic Pollutants  
OAR 340-041-8033**

The criterion for the protection of human health is expressed as 0.040 mg/kg methyl mercury an “organism only”<sup>19</sup> concentration. Contaminated fish and shellfish is the primary human route of exposure to methyl mercury.

Mercury is a naturally occurring element found in air, water and soil and exists in several different forms. Methyl mercury (MeHg) is the organic form of mercury that most easily enters the body. It can form naturally in the soil or water by certain types of bacteria. A number of factors influence the formation of methyl mercury. For example, methyl mercury is more likely to form in a water body where there is a high amount of organic material or where algal blooms are prone to occur. Methyl mercury increases in concentration as it moves up the food chain. Methyl mercury is the form of mercury most toxic to humans. Because methyl mercury accumulates in fish, eating fish is the way most people are exposed to mercury in the environment. Mercury can also cause a range of toxic effects to fish and other aquatic life.

**Current Water Quality Status  
Water Column data**

As noted earlier, IPC analyzed using a hypolimnetic pump system to attain the salmonid spawning temperature criterion below Hells Canyon Dam. In fall 2011, IPC collected hypolimnion samples collected at a depth of over 200 feet from three locations along the thalweg of the reservoir upstream of Brownlee Dam. IPC analyzed the samples for total and methyl mercury. For comparison with current water quality conditions (i.e. what is flowing out of Brownlee Reservoir currently), IPC also collected samples from the discharge below Brownlee Dam at three locations across the channel. The results of the water column sampling are summarized in Table 33, below. None of these samples exceeded the acute aquatic life criterion of 2.4 ug/L or the chronic aquatic life criterion of 0.012 ug/L.

**Table 33: Total Mercury and Methyl Mercury (adapted from IPC June 2018 application Exhibit 6.6-3, Page 27)**

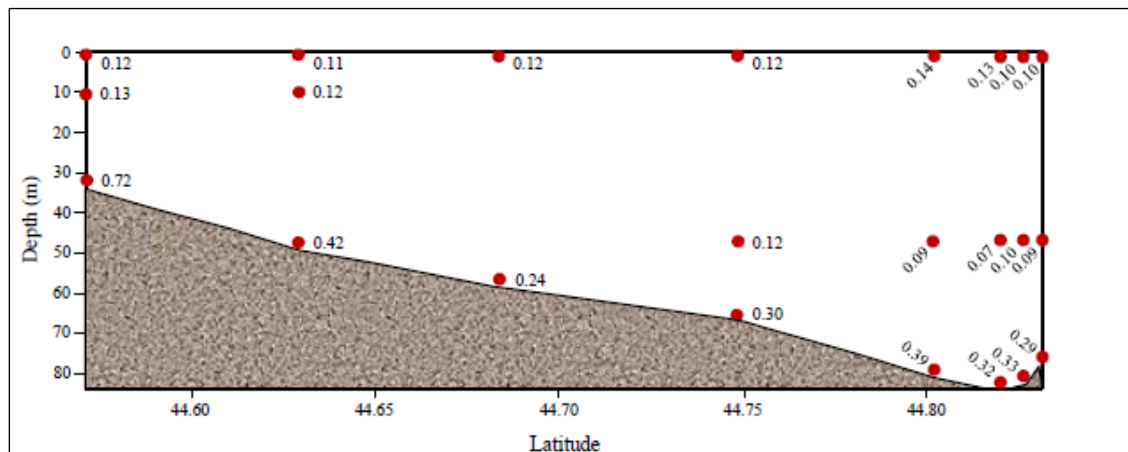
Site	Brownlee Reservoir Hypolimnion (ug/L)			Oxbow Reservoir at Brownlee discharge (ug/L)		
	1	2	3	4	5	6
RM	286	286.5	287	283.8	283.8	283.8
Total Mercury (ug/L)	0.0042	0.0039	0.0048	0.0006	0.0006	0.0007
Methyl mercury (ug/L)	0.0027	0.0025	0.0029	0.0001	<0.0001	0.0001
Percent methylmercury	64%	64%	60%	17%		14%

USGS collected additional water column samples in Brownlee Reservoir in May 2012. USGS sampled at eight locations, and at three depths in each location (surface, intermediate, near bottom). Total mercury concentrations ranged from 0.00075 ug/L to 0.00308 ug/L (Idaho Power Company, 2018) (Exhibit 6.6-3,

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<sup>19</sup> The “organism only” criteria are established to protect fish and shellfish consumption and apply to waters of the state designated for fishing, from OAR 340-041, Table 40, Human Health Criteria Summary.

page 26). Higher concentrations tended to occur in deeper waters, particularly for MeHg, as seen in Figure 28, below (Idaho Power Company, 2018)(Exhibit 6.5-3, Page 27).



**Figure 28: Water MeHg concentrations (ng/L) in Brownlee Reservoir**

None of these samples exceeded the acute aquatic life criterion of 2.4 ug/L or the chronic aquatic life criterion of 0.012 ug/L. Data for total mercury in the Snake River downstream of Brownlee dam is limited. Total mercury data was collected in Oxbow reservoir in 2006. These data ranged from 0.00097 ug/L to 0.00171 ug/L (Idaho Power Company, 2018)(Exhibit 6.6-3, Page 29). The aquatic life criteria were not exceeded in this data set.

Oregon's water quality standards do not include water column criteria for methyl mercury, only for total mercury. However, as seen in Table 33, the methyl mercury concentrations in the Brownlee Reservoir hypolimnion are elevated in comparison to the samples collected near the Brownlee reservoir discharge. The downstream effect of the methyl mercury values will be evaluated if a pump system or any temperature control structure that accesses Brownlee Reservoir hypolimnion water is proposed.

### Fish tissue data

As noted in the section "Water Quality Impairment in the Snake River" the Snake River is water quality limited for mercury in the 2012 Integrated Report. The water quality limited status includes Snake River miles 173 to 404 based on a public health advisory from 1994. The Oregon Health Authority, Public Health Division, includes the Snake River on its list of fish advisories and consumption guidelines, for consumption of resident fish. The advisory includes the Snake River from just south of Adrien, OR north to the WA border and includes Brownlee Reservoir and the Powder River arm.

(<http://public.health.oregon.gov/HealthyEnvironments/Recreation/FishConsumption/Pages/fishadvisories.aspx>)

(Downloaded 11/19/2018).

IPC notes, "Many researchers have reported mercury and methylmercury concentrations in fish tissue collected in the HCC as well as throughout the Snake River watershed (Clark and Maret 1998; Adams 2008; Essig and Kosterman 2008; and Essig 2010) (as cited in June 2018 section 401 application). While most of these studies reported samples exceeding criteria, there are limitations to making meaningful conclusions due to insufficient sample size or composited samples, mixtures of whole body and muscle tissue, fish species across trophic levels, and varying fish sizes (Essig and Kosterman 2008; Essig 2010; Harris and Beals 2013)." (Idaho Power Company, 2018)(Page 138).

In spring 2013, IPC collected fish-tissue samples for methylmercury from 30 smallmouth bass in each of the HCC reservoirs, Brownlee, Oxbow, and Hells Canyon and from 30 smallmouth bass from the Snake River below Hells Canyon Dam, for 120 samples. As seen in Figure 29 below, the methylmercury levels in smallmouth bass muscle tissue generally increased with size (in mm). Of the smallmouth bass sampled, 112 exceeded Oregon’s human health criteria of 0.040 mg/kg. The eight that met Oregon’s methylmercury criteria were from Oxbow Reservoir and the Snake River below Hells Canyon Dam and were from the smallest size group (<100 mm). IPC notes, “The methylmercury levels found in the bass muscle tissue are an issue because the data indicate an exceedance of both Idaho and Oregon water-quality criteria for methylmercury in fish tissue” (Idaho Power Company, 2018)(Page 139).

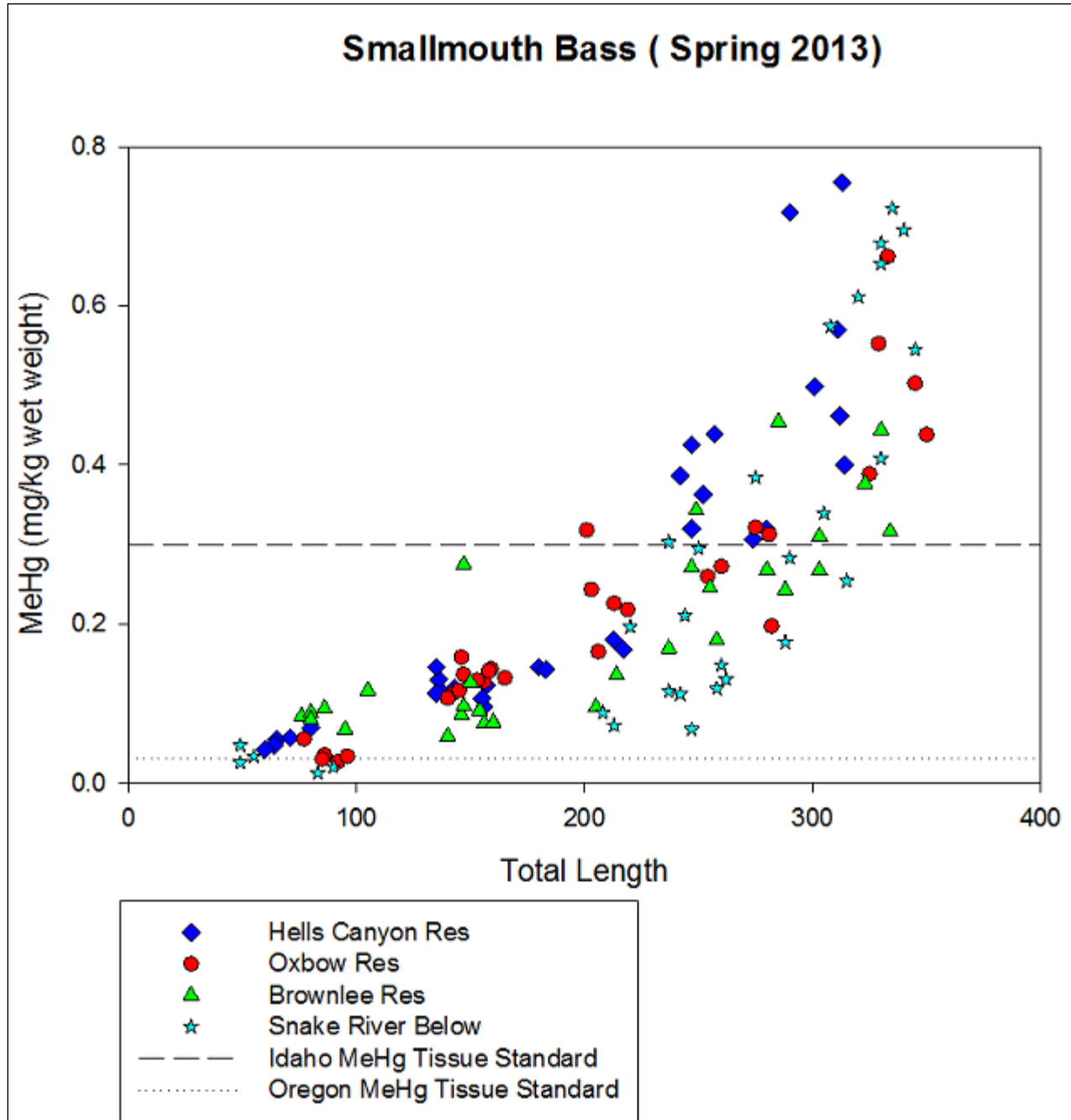


Figure 29: Smallmouth bass methylmercury tissue concentrations. (IPC June 2018 application, Figure 6.6-1)



IPC collected additional smallmouth bass tissue data upstream, within and below the Hells Canyon Complex. IPC notes, “Levels of methylmercury generally increase in fish tissue downstream through the HCC reservoirs, with some of the higher levels observed within Hells Canyon Reservoir. Generally, levels decline downstream of HCD, with some of the higher levels immediately below HCD” (Idaho Power Company, 2018)(Page 140). Tissue collected from bull trout and white sturgeon indicates exceedances of Oregon’s methyl mercury criterion for the protection of human health (Pages 141-142). Tissue samples collected from “Adult SRFC salmon were all below the Idaho human-health fish tissue criterion but were more variable, ranging from 0.029 to 0.21 mg/kg of methylmercury with a median value of 0.087 mg/kg wet weight” (Idaho Power Company, 2018)(Page 141). Most of these samples exceeded the methyl mercury human health criterion of 0.040 mg/kg. These data indicate that the fish consumption advisory and the water quality limited status on the 2012 integrated report for the Snake River are justified and supported by recent fish tissue data.

**Sediment data**

Oregon’s water quality standards do not address methyl mercury levels in sediment. However, sediment methylmercury data can be compared to regional or local sediment methyl mercury data. As noted in the June 14, 2018 application, the methylmercury concentrations in Brownlee Reservoir sediments are elevated. IPC notes, “In contrast, sediment MeHg concentrations in Brownlee Reservoir sediments (12 ng/g median 5-18 ng/g range) were significantly higher than the range reported for natural waters and reservoirs (< 2 ng/g) (Idaho Power Company, 2018)(Exhibit 6.6-3, Page 30). Figure 30 summarizes these data.

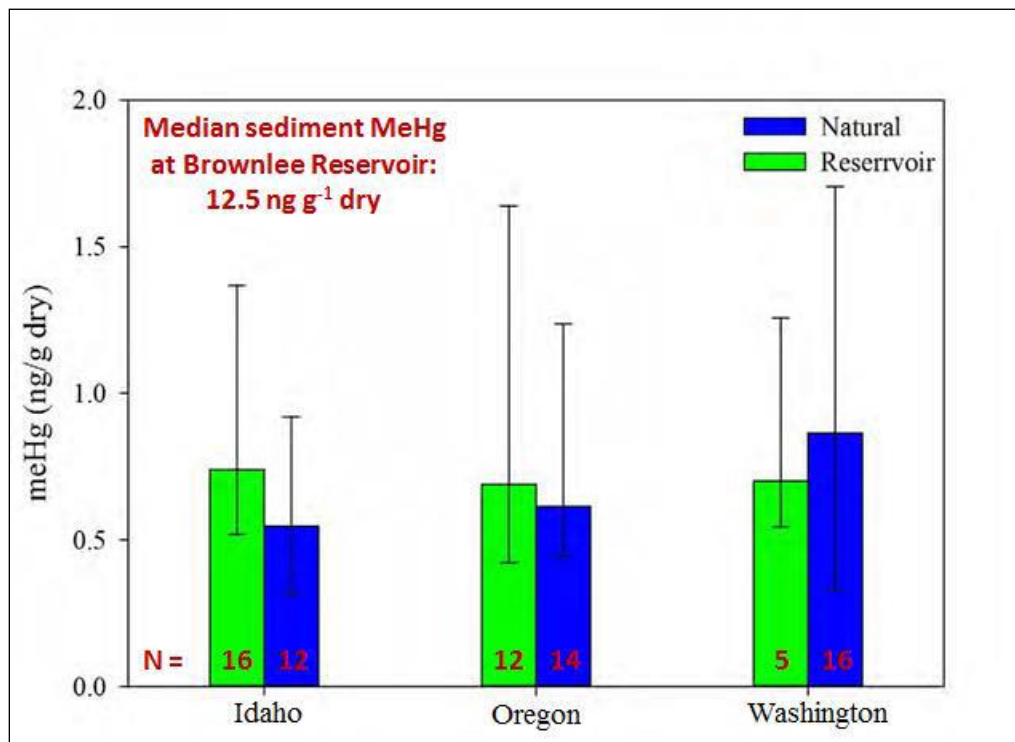


Figure 30: Methylmercury in the top 2 cm of natural lakes and reservoirs (IPC June 2018 application, Exhibit 6.6-3, Figure 3-9)

**Applicant's proposed measures:**

Within the Hells Canyon Complex, the primary concern is elevated concentrations of methyl mercury in the sediment and hypolimnion water column in Brownlee Reservoir. IPC is currently involved in a collaborative study with the United States Geological Survey (USGS) to answer some of the questions about the fate and transport of methyl mercury within and below the Hells Canyon Complex. IPC estimated that this study and analysis effort will take between 7–10 years, and it began in 2014. The study goals include defining the key mercury processes for the Hells Canyon Complex that influence methyl mercury production, accumulation in the water column, and availability to biota. This information will be used to develop a predictive model of the HCC that includes dominant processes of methyl mercury production and bioaccumulation, and allows for scenario testing. As explained by IPC “The third goal includes developing applied science to help define the outcomes of various resource management alternatives to reduce methyl mercury exposure to HCC food webs” (Idaho Power Company, 2018)(Page 146). Recently, USGS provided an update to the mercury study<sup>i</sup> and noted that USGS plans scenario testing in 2021.

DEQ received several comments on the length of time needed to develop the predictive model and evaluation of management alternatives. In response to this comment, DEQ edited the water quality certification to require IPC to complete the study and the predictive model no later than one year following issuance of the FERC license, or another, later date approved by DEQ.

**DEQ Evaluation and Findings:**

DEQ is reasonably assured that Project operation will comply with the toxics criteria provided IPC implements the following measures:

- IPC continues to assist in funding the USGS mercury and methylmercury study as described in the application for section 401 certification, which includes the development of a predictive model.
- IPC updates DEQ annually on the progress of the cooperative studies with USGS.
- IPC provides DEQ with a report identifying the key processes that influence methyl mercury production in the Hells Canyon Complex.
- No later than one year following issuance of the FERC license, IPC shall complete the study and the predictive model, unless a later date is approved by DEQ.
- IPC proposes a methyl mercury management plan to address the Hells Canyon Complex's role in methyl mercury production.
- IPC implements the methyl mercury management plan.

**7.2.8 Antidegradation:**

Water quality standards have three elements: the beneficial uses to be protected by the standard, numeric and narrative criteria that support these uses, and an antidegradation policy that governs how and when existing water quality may be lowered. EPA recently updated the antidegradation policy, as described in 40 CFR 131.12.

**340-041-0004**

The applicable standard can be found in its entirety in OAR 340-041-0004. The following section describes the purpose of the antidegradation policy:

Antidegradation

*(1) Purpose. The purpose of the Antidegradation Policy is to guide decisions that affect water quality such that unnecessary further degradation from new or increased point and nonpoint sources of pollution is prevented, and to protect, maintain, and enhance existing surface water quality to ensure*

*the full protection of all existing beneficial uses. The standards and policies set forth in OAR 340-041-0007 through 340-041-0350 are intended to supplement the Antidegradation Policy.*

**§ 131.12 Antidegradation policy and implementation methods.**

- (a) The State shall develop and adopt a statewide antidegradation policy. The antidegradation policy shall, at a minimum, be consistent with the following:
- (1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
  - (2) Where the quality of the waters exceeds levels necessary to support the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.
    - (i) The State may identify waters for the protections described in [paragraph \(a\)\(2\)](#) of this section on a parameter-by-parameter basis or on a water body-by-water body basis. Where the State identifies waters for antidegradation protection on a water body-by-water body basis, the State shall provide an opportunity for public involvement in any decisions about whether the protections described in [paragraph \(a\)\(2\)](#) of this section will be afforded to a water body, and the factors considered when making those decisions. Further, the State shall not exclude a water body from the protections described in [paragraph \(a\)\(2\)](#) of this section solely because water quality does not exceed levels necessary to support all of the uses specified in section 101(a)(2) of the Act.
    - (ii) Before allowing any lowering of high water quality, pursuant to [paragraph \(a\)\(2\)](#) of this section, the State shall find, after an analysis of alternatives, that such a lowering is necessary to accommodate important economic or social development in the area in which the waters are located. The analysis of alternatives shall evaluate a range of practicable alternatives that would prevent or lessen the degradation associated with the proposed activity. When the analysis of alternatives identifies one or more practicable alternatives, the State shall only find that a lowering is necessary if one such alternative is selected for implementation.
  - (3) Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.
  - (4) In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with section 316 of the Act.
- (b) The State shall develop methods for implementing the antidegradation policy that are, at a minimum, consistent with the State's policy and with [paragraph \(a\)](#) of this section. The State shall provide an opportunity for public involvement during the development and any subsequent revisions of the implementation methods, and shall make the methods available to the public.

**Application of Standard**

Under the federal Clean Water Act, states are required to adopt water quality standards and these standards must include an antidegradation policy. By regulation, EPA requires that antidegradation policies must maintain and protect existing uses and where water quality is better than what is required to

support existing and designated beneficial uses, the state may allow additional degradation of waters only after satisfying specified procedural and substantive requirements.

DEQ's antidegradation policy provides a means for maintaining and protecting water quality of surface waters by requiring that all activities with the potential to affect existing water quality undergo review and comment prior to any decision to approve or deny a permit or certificate for the activity. The antidegradation policy complements the use of water quality criteria. View DEQ's antidegradation policy implementation document and other associated documents at:

<https://www.oregon.gov/deq/wq/Pages/WQ-Standards-Antidegradation.aspx>

**DEQ Evaluation and Findings:**

DEQ implements the antidegradation policy through the antidegradation review. Tier 1 and Tier 2 reviews are included in this antidegradation review.

- Tier 1: The EPA Tier 1 antidegradation regulations are for protection of existing uses defined in EPA's regulations as "those uses actually attained in the waterbody on or after November 28, 1975." The basic protection provided by Tier 1 applies to all waters, regardless of use designation. There have been no changes to the Snake River since DEQ updated the designated uses in 2003. The existing uses in the Snake River through the Project are equivalent to the designated uses. DEQ has determined that the Project operations, following implementation of the section 401 water quality certification with conditions, will protect designated uses, which are equivalent existing uses. This Tier 1 analysis results in a finding that Tier 1 protection is achieved
- Tier 2 protection ensures that an activity in Oregon waters will not result in a lowering of water quality. If DEQ finds that the activity will result in a lowering of water quality, DEQ must demonstrate in an in-depth Tier 2 review that such a lowering meets antidegradation requirements set out in 340-041-0004(6), for high quality waters, or 340-041-0004(9), for water quality limited waters, whichever is applicable. DEQ has evaluated the proposed operating conditions of the Project under a new license. DEQ has determined that there is reasonable assurance that proposed Project operations under the new license will not lower water quality, provided that the conditions required under the section 401 certification are met. DEQ is therefore, reasonably assured that the antidegradation policy will be supported. Because the proposed Project operations, with the section 401 conditions implemented will not result in lowering of water quality, DEQ may proceed with the review of the section 401 application. DEQ does not need to conduct an in-depth Tier 2 Review.

Based on the antidegradation review DEQ finds that federal requirements at 40 CFR 131.12 have been met; that state requirements at OAR 340-041-0004 have been met and that Tier 1 and 2 protections are afforded with the Project operations subject to the conditions in the section 401 water quality certification.

DEQ is reasonably assured that Project operation will comply with the antidegradation policy provided IPC carries out all its proposed actions, including without limitation the obligations in the Settlement Agreement, and all conditions described in the Clean Water Act Section 401 water quality certification.

## **8 Evaluation of Compliance with Sections 301, 302, 303, 306 and 307 of the Federal Clean Water Act**

In order to certify a project pursuant to §401 of the federal Clean Water Act, DEQ must find that the project complies with applicable provisions of Sections 301, 302, 303, 306 and 307 of that Act and state regulations adopted to implement these sections. Sections 301, 302, 306 and 307 of the federal Clean Water Act deal with effluent limitations, water quality related effluent limitations, national standards of performance for new sources and toxic and pretreatment standards. All of these requirements relate to point source discharges and are the foundation for conditions incorporated in National Pollution Discharge Elimination System (NPDES) permits issued to the point sources. Point source discharges at hydroelectric projects may include cooling water discharges, stormwater, and sewage discharges. Section 303 of the Act relates to Water Quality Standards and Implementation Plans. The federal Environmental Protection Agency (EPA) has adopted regulations to implement Section 303 of the Act. The EQC has adopted water quality standards consistent with the requirements of Section 303 and the applicable EPA rules. The EQC standards are codified in OAR Chapter 340, Division 41. EPA has approved the Oregon standards pursuant to the requirements of Section 303 of the Act. Therefore, the Project must comply with Oregon Water Quality Standards to qualify for certification. As discussed above in this report, the proposed Project will comply with Oregon Water Quality Standards and therefore Section 303 of the Clean Water Act, provided the conditions to the section 401 Certification are satisfied.

### **Required NPDES Permits**

IPC has a National Pollutant Discharge Elimination System (NPDES) permit for the Hells Canyon dam and power facility (DEQ file number 41297, EPA permit number OR-002727-8). The permit contains limits for oil and grease of 10 mg/L. The limit applies to outfalls 001-003 for non-contact cooling water and outfall 004 for sump wastewater.

IPC has a NPDES permit for the Oxbow Dam power plant (DEQ file number 41299, EPA permit number OR 002728-6). The permit contains limits for oil and grease of 10 mg/L. The limit applies to outfalls 001-004 for non-contact cooling water and outfall 005 for sump wastewater.

Facilities engaged in upland construction activities that will disturb more than one acre of land and which may reasonably result in surface water discharge to waters of the state must obtain a construction stormwater permit from DEQ. Certain actions required of IPC pursuant to a new FERC License may require that IPC obtain a NPDES 1200-C construction stormwater permit prior to construction. DEQ will condition this section 401 water quality certification to require IPC to obtain all applicable permits prior to engaging in activities that may result in discharge to waters of the state.

## 9 Evaluation of Other Appropriate Requirements of State Law

As part of the evaluation of an application for §401 certification, DEQ must evaluate whether the activity for which certification is sought will comply with other appropriate requirements of state law (OAR 340-048-0042(2)). Such requirements are “appropriate” if they have any relation to water quality, see *Arnold Irrigation Dist. v. DEQ*, 79 Or App 136 (1986); *PUD No.1 of Jefferson Co. v. Washington Dept. of Ecology*, 511 U.S. 700 (1994); *S.D. Warren v. Maine Board of Env'tl. Prot., et. al*, 547 U.S. 370 (2006) .

The Environmental Protection Agency’s (EPA’s) policies, rules and regulations pertaining to implementation of the Federal Clean Water Act clarify that DEQ’s responsibility for protection of water quality “involves far more than just addressing water chemistry.” See Letter from EPA Assistant Administrator, LaJuana S. Wilcher, to Lois D. Cashell, Secretary to Federal Energy Regulatory Commission (Jan 18, 1991) (Attachment A/# to Evaluation and Findings Report).

Specifically, the EPA has explained:

“protection of water quality includes protection of multiple elements which together make up aquatic systems including the aquatic life, wildlife, wetlands and other aquatic habitat, vegetation, and hydrology required to maintain the aquatic system. Relevant water quality issues include the toxicity and bioaccumulation of pollutants, the diversity and composition of the aquatic species, entrapment of pollutants in sediment, stormwater and nonpoint source impacts, habitat loss, and hydrologic changes. A State may need to address any one or combination of these factors in particular circumstances in order to meet the mandates of the Clean Water Act (CWA) articulated in Section 101(a) ‘to restore and maintain the chemical, physical, and biological integrity of the nation’s waters.’”

*Id.* Consistent with that goal of the Federal Clean Water Act to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters,” 33 U.S.C. 1251(a), Oregon law provides for the restoration of native fish populations (and the aquatic systems that support them) to productive and sustainable levels that will provide environmental, cultural and economic benefits. ORS 541.895-898. Further, consistent with the objectives of the Federal Clean Water Act to provide “for the protection and propagation of fish, shellfish, and wildlife and [] for recreation in and on the water,” Oregon law also requires measures be taken to prevent serious depletion of any indigenous species and requires measures to maintain all species of fish and wildlife at optimum levels for the benefit of present and future generations. ORS 496.012; OAR 635-007-0502 – 0505; see also ORS 496.435 (providing for the promotion of rehabilitation and restoration of salmon and trout species to historic levels of abundance); ORS 509.585 – 509.645 (requiring all owners of artificial obstructions to provide for upstream and downstream passage where migratory native fish are currently or have historically been present); OAR 635, Division 412 (same).

Further, it is public policy of the state of Oregon

to protect, maintain and improve the quality of the waters of the state for \* \* \* the propagation of wildlife, fish and aquatic life and for \* \* \* recreational and other legitimate beneficial uses.

ORS 468B.015(2). Specifically, DEQ is charged with abating pollution, which is defined as including “other alteration of the physical \* \* \* properties of any waters of the state \* \* \* [that] can reasonably be expected to [be] injurious to \* \* \* fish [and] aquatic life or the habitat thereof.” OAR 340-041-0002(45). *See also* 33 USC 1362(19) (defining “pollution” as “man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.”). Thus, the above state laws pertaining to, among other goals, restoration of native fish populations and provision of passage for native migratory fish species, are both consistent with the Federal Clean Water Act’s provisions and state-water quality laws and standards. These state laws are also water-quality related laws, because DEQ finds that water quality includes overall protection of the multiple elements that together make up aquatic ecosystems, including resident biological communities and aquatic life and habitat. *See Arnold*. Accordingly, these water-quality-related laws constitute other appropriate requirements of state law that DEQ may consider in its certification process. *See* 468B.040; 33 U.S.C. 1341(d).

## 9.1 Department of Environmental Quality

### Onsite Septic Systems

On-site disposal of sewage is governed by ORS 454.705 et. seq. and OAR Chapter 340, Divisions 71 and 73. The purpose of these rules is to prevent health hazards and protect the quality of surface water and groundwater. IPC indicates there are no plans for waste facilities at the Project location. The DEQ has permitted (OR 002727-8) a sewage holding tank for the Hells Canyon Project. As such, no treated or untreated sewage is disposed directly to surface waters of Oregon or Idaho.

### Hazardous Materials

ORS 466.605 et. seq. and ORS 468.780-815 establish requirements for reporting and cleanup of spills of petroleum products and hazardous materials. ORS 468.742 requires submittal of plans and specifications for water pollution control facilities to DEQ for review and approval prior to construction. One of the purposes of these statutes and rules is to prevent contamination of surface or groundwater

## 9.2 Department of State Lands

ORS 196.810 requires that permits be obtained from the Oregon Department of State Lands (DSL) prior to any fill and removal of material from the bed or banks of any stream. Such permits, if issued, contain conditions to assure protection of water quality to protect fish and aquatic habitat. The proposed new license will include construction activities which may require a removal-fill permit from DSL, a dredge and fill permit from the Corps pursuant to § 404 of the Clean Water Act, and a §401 water quality certification from DEQ. Idaho Power Company must first obtain all applicable permits, certificates, and authorizations prior to engaging in activities required under the terms of a new FERC License.

## 9.3 Department of Fish and Wildlife

Oregon Department of Fish and Wildlife administers the state laws summarized below, that pertain to providing and maintaining passage around artificial obstructions, protecting aquatic habitat and protecting and restoring native fish stocks.

- ORS 541.405 Oregon Plan for Salmon and Watersheds  
Restore native fish populations and the aquatic systems that support them, to productive and sustainable levels that will provide environmental, cultural and economic benefits.
- ORS 496.012 Wildlife Policy

This statute establishes ODF&W's primary directive to prevent serious depletion of any indigenous species and to maintain all species of fish and wildlife at optimum levels.

- ORS 496.435 Policy to Restore Native Stocks  
Restore native stocks of salmon and trout to historic levels of abundance.
- ORS 509.580 - 509.645 ODF&W's Fish Passage Law  
Provide upstream and downstream passage at all artificial obstructions in Oregon waters where migratory native fish are currently or have historically been present.
- OAR 635-007-0502 through 0509 Native Fish Conservation Policy
- OAR 635-500-0100-0120 Trout Management
- Maintain the genetic diversity and integrity of wild trout stocks; and protect, restore and enhance trout habitat.
- OAR 635-415-0000-0030 Fish and Wildlife Habitat Mitigation Policy

## 9.4 Department of Water Resources

Under ORS 468.045(2) DEQ is required to make findings that its approval or denial is consistent with the standards established in ORS 543A.025(2) to (4).

These standards can be summarized into the following areas:

1. Standards that mitigate restore and rehabilitate fish and wildlife resources adversely affected by the Project;
2. Any plan adopted by the Pacific Northwest Power and Conservation Planning Council;
3. The Environmental Quality Commission's water quality standards;
4. Operational standards that ensure the Project does not endanger public health or safety, including "practical protection from vulnerability to seismic and geologic hazards";
5. Standards that protect, maintain, or enhance wetland resources such that the Project may not result in a net loss to existing wetland resources; and
6. Standards that protect, maintain, or "enhance other resources in the Project vicinity including recreational opportunities, scenic and aesthetic values, historic, cultural and archaeological sites, and botanical resources" such that reauthorization may not result in net loss to these existing resources.

As discussed above in this evaluation and findings report, over one million adult anadromous Pacific salmon and steelhead historically spawned and reared in the Snake River and its tributaries upstream from Hells Canyon Dam, including the Pine, Powder, Burnt, Owyhee and Malheur river basins in Oregon. However, the Project developments and operations created a physical barrier to native migratory species, effectively disrupting the chemical, physical and biological integrity of Oregon waters upstream of the Project.

As described with particularity in the Settlement Agreement, IPC will provide for an increase in capacity for the production of spring Chinook salmon at Rapid River hatchery. IPC's commitment will lead to an increase in adults returning to an upgraded Hells Canyon trap; therefore, an increase in the number of fish available for placement in Oregon tributaries. Placement of adult fish in Pine Creek will be monitored and IPC will operate screw traps to tag a sufficient amount of juvenile outmigrants for research and analysis. Appropriate pathogen risk assessments, submittal of work and operations plans, as well as limited research in particular



areas will ensure IPC's commitments serve intended purpose of informing appropriate next steps in Oregon waters to meet CWA goals.

In addition, IPC has committed to carrying out extensive habitat evaluation and improvement work in Oregon tributaries, including the establishment of a Habitat Enhancement Fund to enhance native salmonid habitat in tributaries to the Powder River. Consistent with the mission of the Oregon Plan, placement of adult fish restores the ecosystem function of the Pine Creek watershed (and other Oregon watersheds where placement occurs). By placing adult Spring Chinook salmon and summer steelhead in Oregon tributaries the Settlement Agreement provides optimum recreational and aesthetic benefits for present and future generations by increasing the natural species assemblage and fish populations such that they will provide harvest opportunities for Oregon anglers. Further, such placements will also rehabilitate fish resources adversely affected by the Project.

Lastly, the creation of a Water Quality Enhancement Fund will enable DEQ to fund projects to enhance regional water quality in the Snake River or its tributaries in Oregon. DEQ will use this fund to carry out projects it finds mitigate Project's deleterious conditions to fish and other aquatic life, or enhance aquatic habitats, protects beneficial uses, among other water-quality-related purposes. Accordingly, DEQ finds that IPC's proposed actions in its application, including without limitation its obligations in the proposed Settlement Agreement, in addition to the certification conditions, are both consistent with the standards established in ORS 543A.025(2) to (4) and sufficient to address what DEQ has determined are the water-quality-related requirements of state law in ORS chapters 496, 509, 541.

ORS 543A.110 requires DEQ to seek recommendations of the Hydroelectric Application Review Team (HART) before issuing a final decision on water quality certification. The HART consists of staff from ODEQ, ODFW and Water Resources Department (WRD). The HART must determine whether the proposed water quality certification is consistent with State water quality standards and other appropriate requirements of State law. The HART convened on May 16, 2019. The HART discussed the following issues:

- Changes to the water quality certification in response to comments:
  - Inclusion of the Brownlee Operational component for temperature compliance,
  - addition of a requirement to implement alternative measures if minimum dissolved oxygen criteria are not attained,
  - addition of a timeline for development of the mercury model,
  - requirement for more frequent review of the harmful algal blooms monitoring plan, and
  - changes to the order of construction for total dissolved gas structural measures.
- ODFW discussed the Brownlee operational component and provided recommendations for the response to comment section of this Evaluation and Findings report.
- ODFW also asked about reporting requirements for the Brownlee Operational component, which are included as Section II.E.1 of the water quality certification.

Both ODFW and WRD staff agreed that the water quality certification is consistent with Oregon water quality standards and other appropriate requirements of State law.

## **9.5 Department of Land Conservation and Development**

ORS Chapter 197 contains provisions of state law requiring the development and acknowledgement of comprehensive land use plans. This chapter also requires state agency actions to be consistent with acknowledged local land use plans and implementing ordinances.

OAR 340-048-0020 (2)(i)(A) require the application for section 401 certification to include land use compatibility findings prepared by the local planning jurisdiction. In the event a LUCS has not or cannot be issued, compatibility with local land use may alternatively be demonstrated pursuant to OAR 340-048-0020(2)(B - C).

If land use compatibility findings have not been obtained, (the applicant may provide an exhibit which) identifies the specific provisions of the local land use plan and implementing regulations applicable to the activity and describes the relationship between the activity and each of the land use provisions identified in paragraph (A) of this subsection; and discusses the potential direct and indirect relationship to water quality of each finding or land use provision.

In the June 14, 2018 application for section 401 water quality certification, IPC submitted Exhibit 4.3-2 to demonstrate compliance with OAR 340-048-0020(2)(i) in lieu of providing a land use compatibility statement from Baker, Malheur, and Wallowa counties.

IPC notes that lands within the Hells Canyon Complex project boundaries subject to Baker, Malheur, and Wallowa county comprehensive plans are limited. They include a single private parcel in Wallowa County and several private parcels that comprise either small islands in the Snake River or a strip of Brownlee Reservoir shoreline in Malheur County. Private lands within the FERC project boundaries are more extensive in Baker County.

In December 2018, DEQ provided the Exhibit to Malheur County, Baker County and Wallowa County planning departments for their review, as required under OAR 340-048-0020(4). Malheur County planning department responded in a letter in February 2019 and noted that the “use is pre-existing and currently operating. Therefore, the use meets the local land use planning requirements. The Malheur County planning department has no additional recommendations for DEQ regarding the Clean Water Act.”

The Baker County Planning Department responded in a letter in January 2019 and noted “The Baker County Planning Department has reviewed the exhibit that was submitted in lieu of the Land Use Compatibility Statement. Idaho Power Company’s Hells Canyon Complex is considered a pre-existing use and is currently operating; therefore, the use meets local land use planning requirements. The Baker County Planning Department has no additional recommendations for DEQ regarding the Clean Water Act.”

DEQ received no response from Wallowa County.

In Exhibit 4.3-2, IPC compared the HCC project activities to Baker, Malheur, and Wallowa county plans. Each County plan addresses the first 14 Oregon statewide planning goals. The 14 goals are summarized below.

1. Citizen Involvement
2. Land Use Planning
3. Agricultural Lands
4. Forest Lands
5. Open Spaces, Scenic and Historic Areas, and Natural Resources
6. Air, Water, and Land Resources Quality
7. Areas Subject to Natural Disasters and Hazards
8. Recreational Needs
9. Economic Development
10. Housing
11. Public Services and Facilities

12. Transportation
13. Energy Conservation
14. Urbanization

In Exhibit 4.3-2 IPC summarized each planning goal and evaluated the relicensing policies and activities in relation to these planning goals. DEQ's evaluation focuses on the planning goals and activities that are water quality related for each of the three counties with land in the project boundaries.

### **Baker County Comprehensive Plan**

The Baker County Comprehensive Plan addresses the 14 planning goals and the policies that are related to water quality are described below.

#### ***Agricultural Lands***

Baker County's agricultural lands policies include policies that are indirectly related to water quality.

On IPC's lands not used for project facilities, grazing is the most common use. Agricultural use is allowed on most of these lands, along with provisions requiring that such uses be compatible with natural resource conservation and protection. The zoning around the reservoirs indicates the type of use allowed, which in turn impacts water quality. While agricultural zoning maintains open spaces that provide absorption and filtering of runoff, grazing and use of chemicals can destroy vegetation, allowing erosion, and introduce pollutants to water bodies. IPC requires a management plan from the lessee in an attempt to monitor and thus control such potential conditions on lands that are under grazing and agricultural use.

#### ***Open Spaces, Scenic and Historic Areas, and Natural Resources***

Baker County's policies on these resources include policies on maintaining open space as follows: Open space will be addressed and accommodated in related aspects of other land use goals, including agricultural and forest lands; air, land, and water quality; and recreational needs.

IPC notes that the proposed project area provides large areas of open space, consistent with the above policy. The open space will continue to have limited development in the future and no additional development is proposed in the applications for the FERC license or section 401 certification.

Maintenance of open space is directly related to water quality because it preserves natural conditions that allow absorption of runoff.

#### ***Air, Water, and Land Resources Quality***

Baker County's air, water, and land resource quality policies that are water quality related are summarized below:

1. Applicable state and federal laws and standards will be reasonably and effectively administered.
2. The formulation and dissemination of best management practices (BMPs) for agricultural operations that are designed to maintain soil stability and protect air and water quality will be encouraged.
3. Development and use of watersheds and reservoirs to reduce springtime flooding and erosion and to maintain stream flows in the low runoff periods will be encouraged.
5. All use permits involving air, water, or land quality regulations will be conditioned as subject to Oregon Department of Environmental Quality (ODEQ) permits, particularly in mining proposals.
6. The ODEQ's Pendleton staff will be notified of conditional-use permit applications involving air, water, or land quality regulations to obtain their recommendations for the public hearing.
7. The county will cooperate with the Soil and Water Conservation District, Baker Valley Irrigation District, Oregon Department of Fish and Wildlife (ODFW), Natural Resources Conservation Service (NRCS), and private landowners to reduce high water problems by opening existing drain ways and constructing new drains.

8. The county will seek specific and current information from the Oregon Department of Water Resources (ODWR) or the local watermaster's office when water rights for surface and groundwater or stream flow are relevant to a land-use decision.

As part of its license application, IPC included a policy that "Best Management Practices (BMPs) for resource protection should be defined and followed for development, improvement and maintenance activities." This is consistent with Policy 2, though IPC is not an agricultural operation. IPC notes that, consistent with the concept of Policy 6, the ODEQ has been involved in the development of IPC's federal license application. Policies 1 and 5 call for the county to ensure that state and federal regulations are met by uses approved in land-use decisions. While county land use approvals are not required for the proposed project, IPC is working with all state and federal agencies having jurisdiction in some aspect of the project to be consistent with their regulations and standards. The existing and proposed project already provides flood protection and supplements normally low flows, as called for in Policy 3. IPC's license application includes a measure to consider and possibly modify culverts on Hells Canyon and Brownlee reservoirs, a measure that would comply with Policy 7. Additionally, the existing and proposed project reservoirs provide storage for high water volumes contributed by land-use practices and natural storms.

BMPs to protect resources are directly relevant to water quality. By using practices such as minimizing vegetation removal and installing materials to hold soil in place, erosion can be minimized and pollutants to water bodies reduced. Coordination with state and federal agencies in developing the license application for the project, including input from the ODEQ, is directly relevant to water quality. IPC notes that measures that IPC has proposed to implement in the relicensing process will improve water quality. Supplementation of low flows in the fall can have a direct effect on water quality by increasing the amount of water and the velocity of the river.

#### ***Recreational Needs***

Baker County's recreational needs policies include the following: Work cooperatively with IPC, the Bureau of Land Management (BLM), and volunteer citizens to provide at least minimal sanitation facilities along the Snake River Road. IPC is the subject of this policy and notes it will work with the County to provide additional sanitation facilities along the Snake River Road.

#### ***Transportation***

One Baker County's transportation policy is relevant to water quality: "The County should plan, construct, and maintain county roads to acceptable standards based on safety, use, and economics." Road maintenance can directly impact water quality, depending on the type of surface and practices used in maintenance. The road referenced is dirt and gravel, and runoff therefore could affect water quality. IPC notes that they will be using maintenance practices that are not detrimental to water quality.

#### **Malheur County Comprehensive Plan**

The Malheur County Comprehensive Plan addresses the 14 planning goals and the policies related to water quality are described below.

#### ***Agricultural Lands***

Malheur County's agricultural lands policies include the following water quality related policy: The Planning Department will work with the Soil and Water Conservation District, the Oregon State University Extension Service, and the Water Resources Committee to help improve soil conservation methods and water quality.

IPC notes that this policy states measures the County will take to improve soil conservation and water quality. The license application to FERC and applications to the Oregon and Idaho agencies for water-

quality certification include several measures necessary to meet IPC's total maximum daily load (TMDL) allocations and to improve water quality in the reservoirs.

***Open Space, Scenic and Historic Areas, and Natural Resources***

Malheur County's policies on these resources include the following water quality related policies:

18. The county will continue to inventory the location, quality, and quantity of its water resources.
19. The county will implement its water quality management plan.
21. The county will notify and consult with appropriate state agencies during review of development proposals that might affect surface or groundwater quality.
22. The county will encourage the public to take advantage of erosion control and resource management assistance offered by the NRCS and other agencies.
23. The county will cooperate with the ODEQ in protection of surface and groundwater resources.

Policy 18 calls for the County to continue inventorying water quality within its boundaries. IPC has conducted various studies of water quality in the Snake River within the proposed project boundaries, which provides the County with water quality information. Policy 19 states that the County will implement its water quality management plan. IPC participated in the development of the Snake River – Hells Canyon TMDL. Policy 21 calls for consultation between the County and state agencies regarding proposed development. IPC has consulted with the County and the ODEQ during preparation of its federal license application.

IPC notes that Policies 22 and 23 advocate coordination with the NRCS and the ODEQ to protect water quality. IPC is coordinating with these agencies in the relicensing of its hydroelectric project.

***Air, Water, and Land Resource Quality***

Malheur County's air, water, and land resource quality policies include the following water quality related policies:

2. The Planning Department will gather information from private industry on any environmental quality monitoring that may be taking place. Policy 2 states that environmental quality monitoring information will be gathered from private industry. IPC collects environmental monitoring data, which are available in its federal license application.
13. The county will require all developments and land uses to comply with state and federal environmental quality statutes, rules, and standards. This policy requires all developments and land uses to comply with state and federal environmental quality requirements. IPC notes that it is working, through its federal license and state water quality certification applications, to comply with these requirements.

***Public Services and Facilities***

Malheur County's public services and facilities policies include the following water quality related policy:

The county, in considering land use proposals, will ensure that the physical characteristics of the land that affect sewage disposal, water supply, and water quality are carefully considered. IPC notes that various studies prepared by IPC addressed water quality. The studies provide information that the County may use in any comments it might provide on the proposed project.

***The Wallowa County Comprehensive Plan***

The Wallowa County Comprehensive Plan addresses the 14 planning goals and the policies related to water quality are described below.

### ***Air, Water, and Land Resource Quality***

Wallowa County's air, water, and land resource quality policies include the following water quality related policies:

2. Prohibit partitioning, subdividing, and other development that exceeds the carrying capacity of air, land, or water resources.
3. Cooperate and coordinate with state and federal agencies to meet common resource quality regulations.
4. Insist on compliance with resource quality regulations by state and federal agencies.
7. Require compliance of development within Wallowa County with applicable state and federal environmental rules, regulations, and standards.

In response to Policy 2, IPC set forth policies intended to avoid development and other human activities that exceed the carrying capacity of land and water resources, as part of the license application. IPC has worked on its application for project relicensing with federal and state agencies to identify measures that will improve water quality and land resources, including measures to be implemented in the Snake River–Hells Canyon TMDL process.

### **DEQ Evaluation and Findings**

Information presented in Exhibit 4.3-2 and referenced above maintains the proposed activities comply with the requirements of Baker County, Malheur County and Wallowa County Comprehensive plans. This section 401 water quality evaluation specifically addresses the potential impact of Project operations on water quality standards. Water quality criteria that may be impacted by Project operations are evaluated earlier in this document. DEQ conditions proposed activities, as warranted, providing reasonable assurance that these activities will comply with applicable water quality criteria.

DEQ believes the material submitted by IPC in lieu of the LUCS application in Exhibit 4.3-2 adequately identifies and addresses specific provisions of local land use and the implementing regulations applicable to the proposed activity. Furthermore, DEQ is reasonably assured that operation of the Project will not violate the water quality standards given in OAR 340, Division 041 conditioned on the implementation of requirements described in the Settlement Agreement and the conditions in the section 401 certification. DEQ believes the Exhibit 4.3-2 prepared by IPC adequately represents an exhibit as defined by OAR 340-048-0020(2)(i) which demonstrates Project conformity with local land use regulations.

## **10 Public Comment**

DEQ issued a notice inviting public review and comment on the proposed certification. The public comment period ran from December 13, 2018 through February 11, 2019. DEQ conducted an informational meeting and public hearing to discuss the draft section 401 certification on January 9, 2019. One person provided comment at the hearing. DEQ received about 25 comments via email and mail during the public comment period. The list of commenters, comments and response to comments are as follows:

**List of Commenters**

**Signatory**

Joe Mentor  
Anna H. Freitas  
Mary Anne Nash  
Drew Cruickshank  
Ken Diebel  
Gary Faw  
Curtis W. Martin  
Greg Haller  
Wendy McDermott  
Lauren Goldberg  
Kevin Lewis  
Chandra Ferrari  
Carle Merkle  
Faron L. Scissons  
Shannon F. Wheeler  
Michael P. Tehan  
Heather R. Bartlett  
Brett Dumas  
Nathan Small  
Paul L. Arrington  
Theodore Howard  
Gregory M. Hughes  
Austin Hopkins  
Ken Diebel  
Scott Hauser  
Chuck Erickson  
Donald W. Johnson  
Andy Bishop  
Wendy Peterson  
Samantha Baker

**Commenter/Affiliation**

Burns Paiute Tribe  
Oregon Association of Conservation Districts  
Oregon Farm Bureau  
Malheur County Farm Bureau  
Malheur Watershed Council  
Malheur Soil and Water Conservation District  
Oregon Cattleman's Association Water Resources Committee Chair  
Pacific Rivers  
American Rivers  
Columbia Riverkeeper  
Idaho Rivers United  
Trout Unlimited  
Confederated Tribes of the Umatilla Indian Reservation  
Columbia River Intertribal Fish Commission  
Nez Perce Tribe  
NOAA Fisheries  
Washington Department of Ecology  
Idaho Power Company  
Shoshone – Bannock Tribes  
Idaho Water Users Association  
Shoshone - Paiute Tribes  
US Fish and Wildlife Service  
Idaho Conservation League  
Malheur Watershed Council  
Upper Snake River Tribes Foundation  
Private Citizen  
Private Citizen  
Riverside Irrigation District  
Private Citizen  
Oregon Farm Bureau

## 10.1 General Topics

### 1. *Comment from Burns Paiute Tribe*

- The proposed Certification is inconsistent with Upper Snake River Tribe's (USRT) comprehensive plan for Snake River fisheries
- The proposed Certification precludes reintroduction of anadromous fish in the Malheur River
- The proposed Settlement Agreement precludes the Burns Paiute Tribe from using Snake River salmon for its ceremonial fishery on the Malheur
- The proposed Certification is inconsistent with Endangered Species Act recovery efforts for Snake River Fall chinook
- The proposed Certification is inconsistent with the State of Oregon's policy of respecting tribal sovereignty and government-to-government relations with Indian tribes and with the Tribe.
- The proposed Certification is inconsistent with Oregon State water quality standards
- The proposed Certification will cause temperature impacts to listed species
- The proposed Certification will allow inappropriate levels of Dissolved Oxygen throughout the Hells Canyon Complex
- The proposed Certification will allow transportation of toxics downstream from the Hells Canyon Complex.
- At the outset, we note the interests of the Burns Paiute Tribe are in alignment with the interests of other intervenors in the FERC proceeding. Consequently, the Tribe incorporates by reference the comments of other intervenors to the extent those comments are not inconsistent with this letter. The Burns Paiute Tribe will limit additional comments to those concerns that are unique to or of particular interest to the Tribe.

#### **ODEQ Response:**

ODEQ acknowledges the comment. ODEQ responses to the individual comments in the list are in each appropriate section of this document.

### 2. *Comment from Burns Paiute Tribe*

The proposed certification is inconsistent with the State of Oregon's policy of respecting tribal sovereignty and promoting government-to-government relations with Indian tribes and with the Burns Paiute Tribe. The State of Oregon has adopted a policy respecting tribal sovereignty and government-to-government relations with Indian tribes and specifically with the Tribe. Oregon was the first state to pass a state-tribal government-to-government relations law. In 2001, Senate Bill 770 established a framework for communication between state agencies and tribes. Effective government-to-government communication increases our mutual understanding of tribal and agency structures, policies, programs and history. These State and Tribal government-to-government communications inform decision makers in both governments and provides an opportunity to work together on shared interests. The State of Oregon did not consult with the Tribe on the proposed settlement agreement which clearly and adversely affects the Tribe's interests. The State has violated its obligation under state policy to initiate government-to-government consultation on the proposed settlement.

#### **ODEQ Response:**

Following release of the draft settlement agreement, the State consulted with the Tribe on April 1, 2019. That consultation resulted in changes to the settlement agreement initiated by the Oregon Governor's office.



### 3. *Comment from Burns Paiute Tribe*

The proposed certification is inconsistent with Oregon State water quality standards. The Burns Paiute Tribe joins other intervenors who raise this issue. Specifically, the Tribe joins the comments of other intervenors who raise this issue and incorporates those comments by reference with this letter.

The Burns Paiute Tribe does not support the proposed water quality certification and the Tribe does not support the proposed settlement. We are asking both Idaho DEQ and Oregon DEQ to reject the proposed water quality certification and we ask the parties not to sign the settlement agreement.

#### **ODEQ Response:**

ODEQ respectfully disagrees that the water quality certification is inconsistent with Oregon water quality standards. The water quality certification addresses the project's contribution to violations of all applicable water quality standards. The water quality certification has conditions addressing:

- temperature criteria exceedances during the salmonid spawning period in the Snake River downstream of Hells Canyon dam,
- dissolved oxygen criteria exceedances within Brownlee Reservoir and in the Snake River downstream of Hells Canyon dam,
- total dissolved gas exceedances downstream of each dam,
- the project's contribution to methyl mercury violations,
- the project's contribution to harmful algal blooms,
- the project's effect on biocriteria including macroinvertebrates, managing entrapment and maintaining minimum flows.

ODEQ finds a reasonable assurance that proposed activities, as conditioned, will be conducted in a manner that will not violate water quality standards for the reasons specifically described in the applicable section of this Evaluation and Findings Report.

### 4. *Comment from Confederated Tribes of Umatilla Indian Reservation*

The CTUIR is concerned that meeting water quality standards and complying with the law—the Clean Water Act—cannot be assured before a new license is issued in this instance. We question how a valid §401 certification can be issued when compliance would not be assured at the time of FERC license issuance, but would in fact remain speculative, possibly—hopefully—occurring at some point in the future—possibly the distant future—assuming that the range of mitigation and restoration actions are fully identified, implemented, and successful.

We would encourage ODEQ to consider more aggressively “condition[ing] any granted certificate” so that applicable water quality standards are met, sooner rather than later. The CTUIR acknowledges such provisions as the Brownlee Operational Component and the Alternative Measures Plan and welcomes their addition, but we remain concerned that they still may not be enough to avoid violating the numeric and narrative criteria for temperature, mercury, and dissolved oxygen.

#### **ODEQ Response:**

To attain compliance with the spawning temperature criteria, IPC has 15 years to attain half of the thermal benefits and 30 years to attain 100% of the thermal benefits using the Snake River Stewardship Program. Oregon's temperature standard allows establishment of a compliance schedule, and this schedule is reasonable given the necessary project design and implementation that must occur. Further, while compliance with the spawning temperature criteria is not expected

for a portion of the license term, several conditions for other parameters are scheduled on a much shorter timeline or are already in place.

For example, IPC is required to implement the Brownlee Operational Component when the forecast indicates a high probability of exceeding 16.5 degrees Celsius. IPC will implement the Brownlee Operational Component upon FERC license issuance, as needed, based on forecasted water temperature. IPC will complete installation of all four distributed aeration units at Brownlee powerhouse by 2020. IPC is currently implementing the Riverside Operational Water Quality Improvement Project, the Grand View Sediment Reduction Program, and the Swan Falls Project Aquatic Vegetation and Debris removal program to address its dissolved oxygen allocation in the Snake River Hells Canyon TMDL.

The June 2018 application for water quality certification describes the timeline for IPC to design, construct and install the total dissolved gas measures. IPC is required to construct and install the Oxbow Dam spillway flow deflector within 2 years of completing FERC's required design review process. IPC will construct and install the Hells Canyon sluiceway flow deflectors within 2 years of construction of the Oxbow Dam spillway flow deflector. IPC will construct and install Brownlee Dam spillway flow deflectors within 2 years of construction of the Hells Canyon Dam sluiceway flow deflectors. The water quality certification describes this schedule in Section VI.A.2.

**5. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited***

Brownlee Reservoir receives and accumulates large quantities of nutrients, pesticides and other contaminants. The interactions of these contaminants lead to ongoing water quality issues that include algal blooms, fish kills and, in part, the methylation of organic mercury into a transmissible, bio-accumulator that threatens fish, wildlife and humans. During the summer, it is not uncommon to hear and read news reports of family pets sickened or killed after encountering toxic blue/green algae in Brownlee reservoir. The draft 401 certification conditions focus almost entirely on monitoring and reporting instead of requiring the implementation of corrective actions that will lead to compliance with water quality standards. These corrective actions need to focus on both reducing the inflow of contaminants entering Brownlee reservoir and reducing the reservoir contaminants that have accumulated since the project was constructed - this includes the remediation of the layer of nutrients and other materials discovered during remote submersible exploration.

**ODEQ Response:**

EPA approved the Snake River Hells Canyon TMDL in 2004. The TMDL addressed nutrients, nuisance algae and dissolved oxygen, pesticides, sediment, temperature and total dissolved gas. The TMDL noted "Anthropogenic nonpoint sources of phosphorus in the SR-HC area include (among others) agricultural sources such as runoff from fertilized fields, sediment-bound transport from plowing, and flood and furrow irrigation, as well as organic enrichment; sediment-bound transport and organic enrichment from forestry sources such as logging and streambank disturbance; and urban/suburban sources including stormwater runoff, improperly functioning septic and sewer systems and lawn fertilizers" (Page 269). The TMDL noted "Elevated phosphorus concentrations have been observed in the Upstream Snake River segment (RM 409 to 335), in the inflowing tributaries and in many of the agricultural drains where they enter the Snake River" (page 269). The TMDL set total phosphorus load allocations for tributary, point and nonpoint sources to the Snake River. IPC received a dissolved oxygen load allocation for Brownlee Reservoir to offset the calculated reduction in assimilative capacity due to the Hells Canyon Complex reservoirs. IPC is responsible for its projects effects on water quality and ODEQ has determined based upon its proposed operations that implementation of the Riverside

Operational Water-Quality Improvement Project, Grand View Sediment Reduction Program and Swan Falls Project Aquatic Vegetation and Debris Removal Program are sufficient to address its load allocation. IPC is responsible for its load allocation described in the Snake River Hells Canyon TMDL. Additionally, as discussed in the mercury section of this response to comments, IPC will develop a model to evaluate management scenarios to address its project effects on mercury methylation.

**6. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited***

Simply put, the stream temperature and water quality problems that exist throughout the Snake River, below, within and above the project area, are too large and complex to address with a watershed restoration only approach. Further, climate change demands that we take immediate action to provide relief from the existing lethal and sub-lethal temperature regime.

**ODEQ Response:**

The water quality certification addresses potential violations of water quality standards through several mechanisms, not just watershed restoration. To address exceedances of the salmon spawning temperature criteria, IPC proposed the Snake River Stewardship Program. IPC Application Exhibit 7.1-5 describes the Snake River Stewardship Program in detail. As noted in Exhibit 7.1-5 “All projects included in the SRSP will need to be designed and implemented consistent with ecologically appropriate restoration quality standards, which are described generally in Section 2.5.1, and in more detail in Attachment 1 (draft restoration quality standards).” Additionally, the water quality certification requires IPC to implement the Brownlee Operational Component when the forecast indicates a high probability of exceeding 16.5 degrees Celsius. IPC will implement the Brownlee Operational Component upon FERC license issuance, as needed, based on forecasted water temperature.

The water quality certification requires IPC to install and operate the distributed aeration systems at Brownlee powerhouse as described in Section 7.2.2 of the June 2018 Application. Specifically, under Section 7.2.2.3, IPC will complete installation of all 4 units by 2020. This condition requires technology to address the dissolved oxygen deficit in the Snake River below Hells Canyon Dam, not watershed restoration.

IPC is currently implementing the Riverside Operational Water Quality Improvement Project, the Grand View Sediment Reduction Program, and the Swan Falls Project Aquatic Vegetation and Debris removal program. IPC chose to reduce phosphorus instead of implementing a structural solution (aeration) at Brownlee Reservoir, as described in the Snake River Hells Canyon TMDL.

Section 7.3.1.2 – 7.3.1.4 of the June 2018 application for water quality certification describes the timeline for IPC to design, construct and install the total dissolved gas measures. The water quality certification condition VI.A.2 describes the timeline in detail. These structural changes to the dam require construction and operation.

**7. *Comment from Nez Perce Tribe***

Unfortunately, the current Draft 401 Certifications, like the prior certifications for which the Tribe provided comments in 2017, fail to provide reasonable assurance of meeting state water quality standards to support issuance of a new 30-50 year license for the HCC. To be sure, many of the proposed terms and conditions in the Draft 401 Certifications aimed at addressing vital water quality criteria will not result in IPC's compliance with applicable state standards until decades into the license term, if at all. Moreover, Oregon and Idaho's reliance on future submissions of revised plans, reports, and studies and their

anticipated outcome, during this decades-long period of non-compliance, fail to meet the reasonable assurance standard. Under the current Draft 401 Certifications, IPC would be allowed to continue to violate applicable water quality standards for the majority, if not all, of the new license term. This lack of timely and reasonable assurance of compliance is unacceptable and inconsistent with Clean Water Act requirements.

The Tribe firmly believes that the Draft 401 Certifications must be significantly changed to ensure IPC, Idaho, and Oregon quickly and faithfully address critical water quality parameters including, but not limited to, methylmercury and spawning temperature exceedances. In addition, the Tribe views the draft Stipulation and Implementation Agreement for Hells Canyon Complex Hydroelectric Project ("Agreement") as unacceptable on its face. As Oregon, Idaho, and IPC are well aware, the Agreement's terms and conditions directly implicate the Tribe as a fisheries co-manager and the Tribe's Treaty-reserved harvest, and cannot be implemented without the Tribe's involvement and the Tribe's agreement.

**ODEQ Response:**

The Nez Perce Tribe asserts that the conditions in the Certification will not result in IPC's compliance with applicable state standards until decades into the license term. The water quality certification addresses the project's contribution to violations of several water quality standards and the timeline to address each is discussed below.

To address exceedances of the salmon spawning temperature criteria, IPC proposed the Snake River Stewardship Program. IPC Application Exhibit 7.1-5 describes the Snake River Stewardship Program in detail. As noted in Exhibit 7.1-5 "All projects included in the SRSP will need to be designed and implemented consistent with ecologically appropriate restoration quality standards, which are described generally in Section 2.5.1, and in more detail in Attachment 1 (draft restoration quality standards)." Project design and implementation will take time, thus the needs for 15 year and 30 compliance dates. Additionally, the water quality certification requires IPC to implement the Brownlee Operational Component when the forecast indicates a high probability of exceeding 16.5 degrees Celsius. IPC will implement the Brownlee Operational Component upon FERC license issuance, as needed, based on forecasted water temperature.

Compliance with other water quality certification conditions is required in a shorter timeline, as discussed below.

Dissolved oxygen timeline: The water quality certification requires IPC to install and operate the distributed aeration systems at Brownlee powerhouse as described in Section 7.2.2 of the June 2018 Application. Specifically, under Section 7.2.2.3, IPC will complete installation of all 4 units by 2020.

Nutrient loads: IPC is currently implementing the Riverside Operational Water Quality Improvement Project, the Grand View Sediment Reduction Program, and the Swan Falls Project Aquatic Vegetation and Debris removal program.

Total dissolved gas: Section 7.3.1.2 – 7.3.1.4 of the June 2018 application for water quality certification describes the timeline for IPC to design, construct and install the total dissolved gas measures. The water quality certification condition VI.A.2 describes the timeline in detail. IPC will install all flow deflectors within six years of the completion of FERC's required design review process.

Comments about climate change are addressed in the Climate Change section (number 21) of this response to comment document.

**8. *Comment from Nez Perce Tribe***

On February 28, 2017, the Tribe submitted comments on the previous draft 401 certifications for the HCC. The comments provided a summary of the Tribe's concerns, including its concerns regarding the critically important issues of methylmercury and water temperature. Unfortunately, many of the concerns the Tribe raised in its 2017 comments have not been addressed in Oregon's and Idaho's current Draft Clean Water Act ("CWA") § 401 Certifications ("Draft 401 Certifications"). Given that IPC's FERC license may be for a term of up to 50 years, it is imperative that the states promulgate strong, comprehensive, transparent, and enforceable 401 certification conditions that protect and enhance environmental conditions upstream, within, and downstream of HCC. These measures are necessary during the relicense term in order to safeguard the fish species upon which the Tribe's Treaty--reserved fishing rights depend. Oregon's and Idaho's current Draft 401 Certifications, therefore, must reflect a conservative management philosophy by containing redundant procedural safeguards and contingencies; favoring frequent monitoring and adaptation to address future conditions and uncertainty in a changing climate; ensuring meaningful tribal and public access to, and comment on, relevant research, data, and other information; and forbidding approaches that sanction effects at or above upper tolerance thresholds to listed and other vulnerable species. To ensure that viable fish populations within the Snake River are protected, the conditions attached to Oregon's and Idaho's Draft 401 Certifications must obligate IPC to immediately institute measures to curtail methylmercury generation within the HCC and to holistically address contamination within and downstream of the HCC as quickly as possible. The Draft 401 Certifications must also facilitate the restoration and maintenance of CWA standards for temperature, dissolved oxygen, and total dissolved gas. In addition, the Draft 401 Certifications must ensure that daily and seasonal flow patterns from Hells Canyon Dam do not limit fish behavior and productivity downstream. Further, the Draft 401 Certifications must require fish passage, introduction, or reintroduction for Snake River fall Chinook, spring Chinook, steelhead, lamprey, and bull trout upstream of the HCC. And finally, the Draft 401 Certifications must account for a changing climate by providing and requiring a range of adaptive management tools.

**ODEQ Response:**

The water quality certification contains several monitoring and reporting requirements for each applicable parameter. The certification also contains adaptive management provisions requiring alternative measures if monitoring and reporting indicates that required actions do not address the Project's contribution to violations of water quality standards. Any reports IPC submits to ODEQ are public information and are available upon request.

Comments about climate change are addressed in the Climate Change section (number 21) of this response to comment document.

**9. *Comment from Nez Perce Tribe***

It remains unclear how Oregon's Draft Evaluation and Findings Report (specifically DEQ Findings found therein) relate to the Draft 401 Certification conditions as there is no reference to the Draft Evaluation and Findings Report in the Draft 401 Certification conditions.

**ODEQ Response:**

Under ORS 468B.040 and Oregon Administrative Rules (OAR) 340-048-0042(2) ODEQ "must evaluate whether the activity for which certification is sought will comply with applicable provisions of Sections 301, 302, 303, 306, and 307 of the Clean Water Act, water quality standards set forth in OAR 340, division 041, and other appropriate requirements of state law." Only after ODEQ makes findings as to whether the proposed activities comply with the applicable standards may ODEQ approve or deny certification. ORS 468B.040(1)(b). The Evaluation and Findings report includes the required findings, see OAR 340-041-0042(5), serving as a record of ODEQ's evaluation of both the proposed action's effect on water quality and the

sufficiency of conditions necessary to certify there is a reasonable assurance that the activities will be conducted in a manner that will not violate applicable standards.

**10. *Comment from Nez Perce Tribe:***

Include the Tribe, along with the Oregon and Idaho DEQs, in the distribution list for all evaluation reports and as an invited participant in evaluation meetings (Sections II.C.6.c, II.E.1.a, ILE.1.b, ILE.1.c, II.E.2,II.E.4, II.F.1).

**ODEQ Response:**

All reports submitted by IPC are public information and are available upon request. ODEQ has considered your request.

**11. *Comment from Nez Perce Tribe:***

It remains unclear if there are aspects of the IPC application that are not going to be or are not approved for implementation by Oregon and Idaho. The Draft 401 Certification appears to only include three sections of the IPC application in their entirety (7.1.5 referred to in Section II.B.1, 7 .2.1 referred to in Section III.B., and Section 7 .3.1.2 referred to in Section VLA.2.). This can be resolved by revising the first sentence in Section I. Project Operation to read "The proposed operations are as particularly described in the Idaho Power Company's June 2018 application and supplements, which are incorporated here in its entirety by this reference" (Exhibit A provides a high level summary of key operations)." (Proposed edits are in italics) Also consider, clarifying Section X.I.

**ODEQ Response:**

The certification contains the conditions that IPC must implement to comply with water quality standards and other appropriate requirements of state law. In some cases, IPC proposed activities for compliance with water quality standards in its application, and in a subset of those cases, the detailed conditions were too extensive to place into the certification, so the applicable Exhibits or applicable sections of the Application were included by reference. However, water quality certification is based upon proposed activities in an entity's application for such certification. Here, certification was based upon evaluation of the activities proposed in the application and those activities required in the Settlement Agreement.

**12. *Comment from Nez Perce Tribe:***

Include the Tribe, along with the Oregon and Idaho DEQs, in the distribution list for all evaluation reports and as an invited participant in evaluation meetings (Sections II.C.6.c, II.E.1.a, ILE.1.b, ILE.1.c, II.E.2,II.E.4, II.F.1). Modify the second sentence in Section II.E.3.a to read: "If ODEQ, after consultation with IDEQ and coordination with the Nez Perce Tribe, does not concur that projects were implemented and maintained..." (Proposed edits are in italics). This edit will demonstrate Oregon's and Idaho's commitment to full co-manager input/participation. Addition of 'Nez Perce Tribe Coordination' section following Section X.J. would demonstrate ODEQ's receptivity to the Tribe's perspective.

**ODEQ Response:**

In the water quality certification, ODEQ is not requiring IPC to consult with any third parties. All data and reports submitted to ODEQ by IPC are public information and are available upon request.

**13. *Comment from Nez Perce Tribe:***

The Tribe applauds several key sections and stresses their importance, specifically Sections II.E. 1.b.i and ii, II.E.2.c, VI.A.2, and IX.B.4.

**ODEQ Response:**

ODEQ acknowledges the comment.

**14. *Comment from Nez Perce Tribe***

A disclaimer/explanation should be added to Exhibit A that clarifies that the Draft 401 Certification conditions apply to IPC's full application.

**ODEQ Response:**

ODEQ drafted the water quality certification based upon evaluation of all proposed activities described in IPC's application for water quality certification. (ODEQ also considered other sources of information as needed in its evaluation). As described above, the water quality certification contains conditions developed and described therein by ODEQ as well as conditions that IPC proposed and, given their length, ODEQ chose to incorporate by reference.

**15. *Comment by Shoshone-Bannock Tribes***

The Shoshone-Bannock Tribes (Tribes), a federally recognized tribe located on the Fort Hall Indian Reservation in Southeastern Idaho with significant interests in the licensing for the Hells Canyon Complex (HCC), have reviewed the available materials for the proposed water quality certification of this major hydroelectric project and offer the following comments for consideration. As a preliminary comment, the Tribes have been actively involved in the licensing process for the HCC for well over a decade and have determined the information presented does not adequately address critical water quality issues that may negatively affect Treaty reserved rights and interests; and, have been discussed throughout the licensing process. The issues presented by the HCC and not sufficiently mitigated by this certification include temperature impacts to listed species, dissolved oxygen issues throughout the complex, the possible transport of toxics downstream, and the abdication of legal obligations by an unsigned 'settlement' agreement for the next twenty years. As such, the Tribes cannot support the issuance of a joint water quality certification as proposed by the States of Idaho and Oregon.

The Tribes are comprised of numerous bands of Shoshone and Bannock peoples. Our homeland covers a vast geographic area of the western United States with a unique tie to the Snake River basin documented by thousands of cultural sites and our traditional cultural practices we continued today. We specifically reserved the right to hunt, fish and gather from the unoccupied lands of the United States in Article IV of the Fort Bridger Treaty of 1868. At that time, the harvest of fish from the Snake River and its tributaries sustained our people; particularly anadromous fish from the middle reaches and tributaries of the Snake River below Shoshone Falls where Spring, Summer, and Fall Chinook and steelhead would spawn each year by the thousands.

Over the past century the Tribes have been relegated to watch as the construction and operations of hydro-electric projects have blocked or impaired fish passage and contribute to the downward spiral of water quality. The HCC blocked hundreds of miles of available habitat in Oregon and Idaho terminating fisheries to the significant detriment of the Tribes and others. The facility continues to affect water quality creating conditions that negatively impact aquatic biota by increasing water temperatures beyond standards and through the production of methyl-mercury in the three pools. The construction and operation of the HCC continues to contribute to the suppression of the Tribes guaranteed rights and interests through the polluting our waters and the depression of our fisheries.

It is hard to understand how a complex can be engineered to manage the Snake River, produce many millions of dollars in profit, and provide power for thousands of homes in the northwest; but still claim to be unable to provide passage for anadromous fish. Since the initial licensing of the HCC, Congress has passed laws such as the Clean Water Act and the Northwest Power Act that place water quality and fish and wildlife concerns in the Columbia River basin on an equal footing with power production and profit. Any new license issued for the HCC must contain mitigation that substantively complies with those current laws. The Tribes have been working through the Hells Canyon Relicensing process for over ten years now, promoting the idea that we must take this opportunity to make this facility work for

anadromous fish and the riverine ecosystem. We have developed policy which allow to us fulfilling our role as a steward of natural and cultural resources in the Snake River basin.

Snake River Management Policy -The Shoshone Bannock Tribes (Tribes) will pursue, promote, and where necessary, initiate efforts to restore the Snake River systems and affected unoccupied lands to a natural condition. This includes the restoration of component resources to conditions which most closely represents the ecological features associated with a natural riverine ecosystem. In addition, the Tribes will work to ensure the protection, preservation, and where appropriate-the enhancement of Rights reserved by the Tribes under the Fort Bridger Treaty of 1868 (Treaty) and any inherent aboriginal rights.

From our perspective, the only thing standing in the way of comprehensive change in how this part of the Columbia River basin is managed is the processes that favor industry and 'status quo' operations over necessary modifications to operations. The Tribes perceive the issues of anadromous fish and water quality as inherently linked; you cannot separate an aquatic species from the riverine environment.

**ODEQ Response:**

ODEQ considered the comments provided by the Shoshone Bannock Tribes in its certification decision. The recitals of the Settlement Agreement describe the purpose for that Agreement, and the document speaks for itself.

**16. *Comment by Washington Department of Ecology***

As stated in our September 2007 letter to the Environmental Protection Agency (EPA), Washington State Department of Ecology (Ecology) is concerned about the component of our Water Quality Standards which apply at the state border: "Temperature shall not exceed 20C, no temperature increases will be allowed which will raise the receiving water temperature by greater than 0.3C nor shall such temperature increases, at any time, exceed 0.3C due to a single source or 1.1C due to all activities combined". Washington State has a strong history of working to recover salmonids in the Columbia basin and this long-term effort has been a benefit to the residents throughout the basin including those that live in Idaho and Oregon. Our State has made significant investments in salmon recovery and we view this project as a critical piece in the basin-wide salmon recovery efforts.

**ODEQ Response:**

In IPC Application Exhibit 7.1-2, IPC estimated the potential downstream temperature effects of the Brownlee operational component. IPC noted that additional drafting of Brownlee Reservoir from September 1 through the second Monday in October could accelerate fall cooling of HCC outflows. However, while outflows from the HCC would be cooler, the increased quantity of HCC water that mixes with tributaries downstream could result in slightly warmer conditions below the Salmon and Clearwater rivers. The deeper drafts of Brownlee Reservoir resulted in a maximum temperature increase of 0.38°C at Anatone in early September.

IPC noted, "While slight increases in temperature could be expected in years of enhanced drafting of Brownlee Reservoir, our analysis of 2015 data indicates any increases should not result in exceedances of the migration standard below Lower Granite Dam. The most aggressive draft scenarios added one day to the original 8-days that temperature exceeded 20°C in the Snake River near Anatone" (Exhibit 7.1-2, Page 8).

ODEQ finds a reasonable assurance that proposed activities, including implementation of Brownlee Operational Component and SRSP, among other conditions, will be conducted in a manner that will not violate water quality standards.



**17. *Comment from Washington Department of Ecology***

Our comments on the draft 401 certification are specific to protection of our downstream standards. We recognize the time and effort that has gone into this 401 certification but believe more needs to be done to protect the integrity of the downstream standards and protect downstream beneficial uses. Specifically:

Establish a timeline for achieving water quality goals - Additionally, we believe that there needs to be a clearly defined timeline for achieving specific water quality goals. Importantly, this framework should also include an alternative strategy(s) should the proposed temperature restoration approach fall short (i.e., EPA's suggested "Plan B"). Since this plan is integrally tied to various studies associated with mercury impacts behind the dams, then it is important that they be completed in a timely fashion and suggest a timeframe be added to the 401 certification for their completion.

**ODEQ Response**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

ODEQ notes that EPA did not provide comments on the draft water quality certification. Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

**18. *Comment from Shoshone-Paiute Tribes***

The Shoshone-Paiute Tribes (Tribes), a federally recognized tribe located in Southwestern Idaho and Northern Nevada with significant interests in the licensing for the Hells Canyon Complex (HCC), have reviewed the 401 certification materials for the proposed water quality certification of this major hydroelectric project and offer the following comments for consideration. As a preliminary comment, the Tribes have been actively involved in the licensing process for the HCC for well over a decade and have determined the information presented does not adequately address critical issues that have been discussed throughout the licensing process. The issues presented by the HCC that are not sufficiently mitigated by this certification include temperature impacts to listed species, dissolved oxygen issues throughout the complex, the possible transport of toxics downstream, and the abdication of legal obligations by an unsigned 'settlement' agreement for the next twenty years. As such, the Tribes cannot support the issuance of a joint water quality certification as proposed by the States of Idaho and Oregon.

The Shoshone-Paiute Tribes of The Duck Valley Indian Reservation encompasses approximately 289,819 acres on the Idaho/Nevada border. There are approximately 2,300 enrolled Tribal members. Reservation lands are located in the Bruneau and Owyhee subbasins of the Middle Snake Province, and are the southernmost drainages of the Columbia River system. With the completion of the Federal Columbia River Power System and the Hells Canyon Complex, anadromous salmonids were extirpated from the

upper portion of the Snake River and its tributaries, which includes The Duck Valley Indian Reservation and the historical fishing areas. The Tribes have been very involved in the relicensing of the Hells Canyon Complex for many years, and have great interest in many aspects of the relicensing of said project, very specifically water quality issues. The Tribes are under the impression that the role of the DEQ's is to protect the water quality within their state's boundaries. We do not believe the current IPC's proposed 401 certifications meets those obligations and feel the states of Oregon and Idaho should not accept the 401 certifications.

**ODEQ Response:**

ODEQ drafted the water quality certification based upon evaluation of all proposed activities described in IPC's application for water quality certification. ODEQ also considered other sources of information as needed in its evaluation. The Evaluation and Findings report describes ODEQ's analysis of IPC's proposed measures to address the Hells Canyon Complex's effect on water quality in IPC's application and IPC required measures in the Settlement Agreement. The water quality certification contains conditions that IPC must implement. Implementation of the proposed activities, as conditioned, provides ODEQ with a reasonable assurance that the Hells Canyon Complex will not cause or contribute to violations of water quality standards.

**19. *Comment from Idaho Power Company***

Finally, we request that the certification should be clear that required implementation of DEQ 401 conditions will commence upon issuance of the new FERC license.

**ODEQ Response:**

The second paragraph of the certification states "Upon Federal Energy Regulatory Commission ("FERC") issuance of a license to Idaho Power Company for the Hells Canyon Complex Hydroelectric Project ("Project"), Idaho Power Company must comply with the following § 401 Certification conditions:"

**20. *Comment from US Fish and Wildlife Service***

The FERC's current environmental compliance document addressing this relicensing action is the 2007 Final Environmental Impact Statement (FEIS) that includes Staff Alternatives based, in part, on comments from license stakeholders through the FPA 10(j) process. While the FERC's 2007 Staff Alternatives and original 10(j) recommendations cover many of the water quality issues surrounding the HCC license, all of these provisions are dated (i.e., 11 years old). Some issues covered in the FEIS may have since been addressed through new and ongoing processes (e.g., draft certifications), studies, and updated data. One of the potential pathways for license issuance is for FERC to issue an updated or amended FEIS that reflects the best available information submitted by agencies, Tribes and other stakeholders in the course of the HCC relicensing process. While the draft water quality certification process and FERC EIS development typically occur during similar timeframes, in this case, all of the stakeholders with FPA 10(j) authority may be asked to re-submit those recommendations again after the draft certification timeline has expired. Thus, these draft certifications may not reflect future updated data or submittals to FERC that could potentially affect the final enforcement provisions of the new license.

To that end, the Service supports a monitoring and adaptive management approach to facilitate the IPC meeting water quality criteria at the HCC. The Service is prepared to assist the DEQs in that monitoring and adaptive management during implementation of the FPA section 18 Bull Trout Passage Plan (BTPP) for the HCC, and the construction and restoration work outlined in the SRSP on the islands of the Deer Flat National Wildlife Refuge.

**ODEQ Response:**

ODEQ acknowledges the comment.

**21. *Comment by Idaho Conservation League***

In addition to the comments and concerns outlined in our comments, we wish to stress our support of the comments made by the Upper Snake River Tribes Foundation (USRTF).

**ODEQ Response:**

ODEQ acknowledges the comment.

**22. *Comment by Upper Snake River Tribes Foundation***

In 2004, the DEQ's jointly issued the Snake River-Hells Canyon TMDL. In the TMDL, the DEQ's determined that the HCC was in violation of WQS related to nutrients, dissolved oxygen, salmonid spawning temperature, and total dissolved gas. High nutrient levels and elevated temperatures drive a cycle of low dissolved oxygen. These impairments exist today, nearly 15 years later, at or near the same level they did in 2004. Additionally, since 2004, mercury/methylmercury have been determined to be impairing cold water aquatic life and secondary contact recreation. In addition to impairing beneficial uses, these impairments have direct consequences on ESA listed species that may occur throughout and below the HCC, including the Snake River physa and bull trout. USRT would like the DEQ's to detail how the permit conditions, including timelines and projected improvements in temperature, dissolved oxygen, excessive nutrient loads, and dissolved gas will be protective of ESA-listed species in the near-term. The conditions placed by the DEQ's in this Certification allow for up to an additional 30 years for IPC to rectify WQS violations attributed to the HCC, which may not even obtain temperature standards below the HCC. Water quality violations have already been ongoing for an extensive period, and to allow an additional 30 years is damaging to the resources. IPC is seeking a 50-year license for the HCC; therefore, the DEQ's are effectively allowing IPC to violate WQS for a minimum of 60 percent of the life of the license. We strongly disagree that IPC be allowed such leniency in meeting WQS. USRT also asks that the DEQ's describe in detail how IPC has been currently meeting their TMDL requirements.

**ODEQ Response:**

To address exceedances of the salmon spawning temperature criteria, IPC proposed implementation of the Snake River Stewardship Program. The Upper Snake River Tribes Foundation is correct that the water quality certification requires Idaho Power Company to attain thermal benefits of 1191.6 billion kilocalories at the inflow to the Project by 30 years after the date that FERC issues a new license. The water quality certification also has a requirement to attain 595.8 bkkal at the inflow to the project by 15 years after the date of FERC license issuance. IPC Application Exhibit 7.1-5 describes the Snake River Stewardship Program in detail. As noted in Exhibit 7.1-5 "All projects included in the SRSP will need to be designed and implemented consistent with ecologically appropriate restoration quality standards, which are described generally in Section 2.5.1, and in more detail in Attachment 1 (draft restoration quality standards)." Project design and implementation will take time. Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive

management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

Additionally, IPC proposed the Brownlee operational component to address forecasted high water temperatures (higher than 16.5°C) during the salmonid spawning period. IPC will implement the Brownlee Operational Component, as needed by forecasting high temperatures, upon FERC license issuance.

Compliance with other water quality certification conditions is required in a shorter timeline, as discussed below.

**Dissolved oxygen timeline:** The water quality certification requires IPC to install and operate the distributed aeration systems at Brownlee powerhouse as described in Section 7.2.2 of the June 2018 Application for water quality certification. Specifically, under Section 7.2.2.3, IPC will complete installation of all four units by 2020.

**Nutrient loads:** The Snake River TMDL requires IPC to add 1,125 tons of dissolved oxygen per season to offset reduction in assimilative capacity caused by the Hells Canyon Complex impoundments. IPC proposes to address the dissolved oxygen load allocation by implementing the Riverside Operational Water-Quality Improvement Project (ROWQIP). IPC determined that a phosphorus load reduction of 6,818 kg P (15,000 lbs-P) is equivalent to the addition of 1,125 tons of oxygen. IPC is currently implementing the Riverside Operational Water Quality Improvement Project and provided data from 2014 -2017. The data indicated (Table 30, Evaluation and Findings Report) that implementation of the ROWQIP was attaining the needed 15,000 lbs-P. IPC is also implementing the Grand View Sediment Reduction Program and the Swan Falls Project Aquatic Vegetation and Debris removal program.

**Total dissolved gas:** Section 7.3.1.2 – 7.3.1.4 of the June 2018 application describes the timeline for IPC to design, construct and install the total dissolved gas measures. The water quality certification condition VI.A.2 describes the timeline in detail. IPC will install the flow deflectors within six years of completion of FERC's required design review process.

### **23. *Comment from Upper Snake River Tribes***

The HCC project area included in the Certification is composed of: 1) Brownlee Reservoir, 2) Oxbow Reservoir, 3) Hells Canyon Reservoir, and 4) Snake River downstream of the Hells Canyon Dam to Sheep Creek. Collectively, these waterbodies are not currently meeting multiple designated beneficial uses including salmonid rearing and spawning, resident fish and aquatic life, anadromous fish passage, and contact recreation. Additionally, USRT and its member tribes assert that salmonid spawning is an unrecognized use upstream of Hells Canyon Dam, which should be protected.

USRT incorporates in full the comments of the Burns Paiute Tribe, Shoshone-Bannock Tribes of the Fort Hall Reservation, and Shoshone-Paiute Tribes of the Duck Valley Reservation in this comment letter. Additionally, USRT supports the comments of the Idaho Conservation League and USFWS.

#### **ODEQ Response:**

ODEQ acknowledges the comment.

**24. *Comment from Chuck Erickson***

This dam is causing thermal pollution that hurts salmon and steelhead fisheries and should not be approved for operations until Idaho Power should compensate by removing the lower four dams on the snake river.

**ODEQ Response:**

As discussed in this Evaluation and Findings Report, the Hells Canyon Complex affects temperature below the Hells Canyon Dam. The water quality certification requires Idaho Power Company to implement the Snake River Stewardship Program and the Brownlee Operational Component to address temperature criteria exceedances.

**25. *Comment from Wendy Peterson***

I would like to know more about this project in regard to algal growth and methylmercury production. I have concerns about this, as well as wild fish habitat.

**ODEQ Response:**

ODEQ acknowledges your concerns. As discussed in this Evaluation and Findings report, the Southwest District Health Authority in Idaho issued several health advisories for Brownlee Reservoir due to the presence of harmful algal blooms. Idaho Power Company is required to work with the Oregon health authority to collect data on harmful algal blooms and post advisories as needed.

Idaho Power Company is currently working with U.S. Geological Service to determine the effect of the hydroelectric complex on the creation of methylmercury. This certification requires IPC to develop and implement measures to control the production of methylmercury caused by the complex.

**26. *Comment from Idaho Water Users Association***

The Coalition has long supported renewal of the Hells Canyon Complex hydropower license in a manner that recognizes and maintains Idaho's sovereignty over the management of its waters. We were discouraged to learn of Oregon's prior efforts to impose passage requirements as a condition of a § 401 Certification. The Coalition opposes fish passage as a condition of a § 401 Certification. This settlement agreement allows the § 401 Certification process to move forward and allows Idaho Power to move closer to obtaining a renewed license for the Hells Canyon Complex.

A § 401 Certification is not an appropriate mechanism to address and impose fish passage obligations. Should Oregon attempt to incorporate such conditions in future certifications, Idaho should respond with a prohibition on fish passage in its certifications, Idaho must maintain sovereignty over its waters – including its right to oppose reintroduction of any species above the Hells Canyon Complex that is listed under the Endangered Species Act. In 2017, the Coalition supported the Idaho Legislature's enactment of House Joint Memorial No. 2 (HJM2). Through HJM2, Idaho's Legislature affirmed its opposition to "passage and introduction of salmon or steelhead above Hells Canyon Dam ... to ensure that Idaho's sovereignty is not violated by the introduction of salmon or steelhead to the reaches of the Snake River, and its Idaho tributaries, above Hells Canyon Dam."

**ODEQ Response:**

The recitals of the Settlement Agreement describe the purpose for that Agreement, and the document speaks for itself.

**27. *Comment from Don Johnson***

The call for comments on Idaho and Oregon clean water certifications ("Dec. 14 started a 60-day public comment period. To provide comments, which will be part of the public record") has prompted me to call

on IDFG to exert pressure on Idaho Power to recognize and address aquatic habitat problems in Idaho tributaries above the Hells Canyon Dam complex. Certification should require extending recognition of salmon habitat problems and addressing those needs in Idaho Snake River tributaries, as well as those in Oregon.

**ODEQ Response:**

This comment appears addressed to Idaho. ODEQ acknowledges the comment.

## 10.2 Fisheries

### 28. *Comment from Burns Paiute Tribe*

The Burns Paiute Tribe requests that the Plan (Hells Canyon Complex Fisheries Resource Management Plan) be incorporated by reference with our comments. We are asking that you include the Plan as part of the terms and conditions of the certification once issued. The Plan details goals, objectives and measures to restore salmon and steelhead to the Snake River and tributaries upstream of the Project for ceremonial, subsistence and recreational purposes, utilizing hatchery surplus. Goals, objectives and measures are phased in over time to track with the anticipated life of the license, once issued. We believe the Plan complements Idaho Power Company's proposed Snake River Stewardship Program in meeting its Clean Water Act §401 certifications by improving habitat conditions in the mainstem Snake River to support the persistence of several aquatic indicator species.

**ODEQ Response:**

ODEQ considered this comment provided by the Burns Paiute Tribe in its certification decision.

### 29. *Comment from Burns Paiute Tribe:*

The proposed certification is inconsistent with Endangered Species Act recovery efforts for Snake River fall chinook. Regulations under the Endangered Species Act clearly state that a recovery plan must include at least two evolutionarily significant stocks. There is only one subspecies of Fall Chinook unless and until Fall Chinook are reintroduced into the upper Snake River basin. A new license for the project based on a certification and agreement that precludes fish passage would violate the Endangered Species Act and the certification itself would violate the Oregon Endangered Species Act.

**ODEQ Response:**

The Endangered Species Act (ESA) provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead federal agencies for implementing ESA are [the U.S. Fish and Wildlife Service \(FWS\)](#) and the [U.S. National Oceanic and Atmospheric Administration \(NOAA\) Fisheries Service](#). The law requires federal agencies, in consultation with the U.S. Fish and Wildlife Service and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species.

Oregon Administrative Rules (OAR 340-041) describe the applicable State water quality standards. The water quality standards address endangered species in the definition of critical habitat, discussion of variances, the antidegradation rule and protection of cold water under the temperature water quality standards. Critical habitat is relevant to waters designated as outstanding resource waters, which does not apply to the Snake River. ODEQ evaluated the water quality certification conditions and determined that the certification complies with the antidegradation rules. The rules for variances and protecting cold water do not apply to the water quality certification.

Under Oregon State law, the Fish and Wildlife Commission through ODFW maintains the list of native wildlife species in Oregon that have been determined to be either “threatened” or “endangered.” There are no specific requirements for the Oregon Endangered Species Act under the State water quality standards (OAR 340-041) or rules governing the water quality certification program (OAR 340-048).

**30. *Comment from Confederated Tribes of Umatilla Indian Reservation***

The CTUIR continues to maintain that, in terms of the Hells Canyon Complex, the State of Oregon should respect its statute regarding fish passage, listed in your Report:

ORS 509.585 – 509.645: This statute requires that owners or operators of all artificial obstructions in Oregon waters where migratory native fish are currently or have historically been present must provide for upstream and downstream passage for native migratory fish.

The CTUIR is disappointed that this relevant State law appears now to have a diminished or nonexistent role in the HCC water quality certification process. It would seem to us that this approach would substantially short-change a significant beneficial use. As we stated earlier, “[m]aintaining the existence of fish resources—or restoring their existence where they once occurred but no longer do so (in no small part due to the construction and operation of the HCC)—is a reasonable and lawful exercise of state CWA authority.

**ODEQ Response:**

ODEQ considered this comment provided by the Confederated Tribes of Umatilla Indian Reservation in its certification decision. The recitals of the Settlement Agreement describe the purpose for that Agreement, and the document speaks for itself.

**31. *Comment from Nez Perce Tribe***

Both Oregon and Idaho have addressed fish passage in their respective Draft 401 Certifications. Oregon includes a native migratory fish passage plan above Hells Canyon Dam while Idaho opposes any action that may result in reintroducing or establishing spawning fish populations in Idaho waters. The Tribe will continue to advocate for the reintroduction of culturally significant species in its usual and accustomed fishing areas, consistent with its Treaty-reserved rights. In keeping with this policy, the Tribe believes that the Draft 401 Certifications must include fish passage and introduction or reintroduction for Snake River fall Chinook, spring Chinook, and steelhead upstream of the HCC. Requiring fish passage, natural production, and habitat improvement above the HCC is necessary to ensure the adequate protection of the Tribe's Treaty-reserved natural and cultural resources and to ensure that the Complex does not cause or contribute to an exceedance of water-quality standards or harm protected beneficial uses. Moreover, requiring fish passage is consistent with Idaho's 1976 law requiring the installation and maintenance, at the owner's expense, of a fishway at any dam that restricts the free and uninterrupted passage of fish in any stream in Idaho.

**ODEQ Response:**

ODEQ considered this comment provided by the Nez Perce Tribe in its certification decision. The recitals of the Settlement Agreement describe the purpose for that Agreement, and the document speaks for itself.

**32. *Comment from Nez Perce Tribe***

The February 14, 1980, Hells Canyon Settlement Agreement between Oregon, Idaho, Washington, U.S. Department of Commerce, and IPC does not address or mitigate for the loss of fisheries resources available to the Tribe and affected by the construction and operation of the HCC. IPC should reach an

agreement with the Tribe regarding mitigation that will address the impact on the Tribe's treaty-reserved rights and develop and implement that mitigation within five years (2024).

**ODEQ Response:**

This comment is addressed to Idaho Power Company. ODEQ acknowledges the comment.

**33. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited***

Third, the draft 401 certification lacks language noting that the ODEQ has a reservation of authority to modify the 401 water quality certification to include fish introduction measures as needed to assure compliance with water quality standards and other appropriate requirements of state law after a 20-year period. While we question the legal validity of excluding the fish passage study requirement from the conditions of the draft certification and including the 20-year wait period, we understand that those terms are stipulations in the Agreement. Such an omission from the certification however makes it more necessary to include specific reservation of authority or reopener language in the draft certification itself affirming ODEQ's authority to condition water quality certification on fish passage measures where a project blocks such passage and where needed to meet the requirements of state law.

**ODEQ Response:**

The certification includes Section X.C, which speaks for itself. Further, the purpose of the CWA is "to restore *and maintain* the chemical, physical, and biological integrity of the Nation's waters." 33 USC 1251(a). Even in the absence of a certification condition specifying adaptive management, states have ongoing authority to ensure compliance with applicable standards.

The recitals of the Settlement Agreement describe the purpose for that Agreement, and the document speaks for itself.

## 10.3 Biocriteria

**34. *Comment from Nez Perce Tribe***

Expand Entrapment Management Plan (Section IX.C) to include displacement. An Entrapment and Displacement Management Plan would ensure predation and bio-energetic impacts to shoreline-oriented rearing juveniles are considered when managing project outflows (specifically, daily power-peaking operations). Juvenile displacement monitoring should be structured around a potential zero load-following period between March 15 and June 15.

**ODEQ Response:**

In its 2006 Section 10(j) submission to FERC, Oregon Department of Fish and Wildlife recommended a 4 inch per hour ramping rate during fall Chinook rearing (mid-March thru mid-June). IPC proposed "A Juvenile Chinook Salmon Entrapment Management Plan for the Upper Hells Canyon Reach of the Snake River" in lieu of the 4 inch per hour ramping rate. ODEQ, in consultation with ODFW, determined that the Juvenile Chinook salmon plan and the summer entrapment monitoring plan are as protective to fall Chinook as the 4 inch per hour ramping rate. ODEQ concurred with this assessment and included the entrapment plans as conditions in the water quality certification.



**35. *Comment from National Marine Fisheries Service***

NMFS supports the requirement in the draft 401 certifications to develop and implement a macroinvertebrate monitoring plan; implement survey and entrapment management plans; and maintain proposed minimum flows in the Snake River downstream of Hells Canyon Dam.

**ODEQ Response:**

ODEQ acknowledges the comment.

**36. *Comment from U.S. Fish and Wildlife Service***

Macroinvertebrate and Periphyton Monitoring

In its application for a CWA certification, the IPC states the need and intent to develop and implement monitoring efforts for macroinvertebrates and periphyton (epilithic algae). The Service supports Snake River macroinvertebrate and algae monitoring because these species are strong indicators of riverine health. The objectives, methods, and timelines for such an effort have not been fully developed in the CWA application. Therefore, we provide the following recommendations for actions to be included in any post-license monitoring efforts: 1) selection and monitoring of adjacent "control" monitoring sites; 2) monitoring of sensitive taxonomic groups not typically included as macroinvertebrates (typically captured as EPT); and 3) monitoring of taxa unique to the Snake River-Hells Canyon system.

**ODEQ Response:**

The water quality certification requires IPC to develop a macroinvertebrate monitoring plan with several minimum components. IPC is required to submit the plan to ODEQ for review and approval. ODEQ will work with IPC to determine what biological assessment model is most appropriate to the Snake River below Hells Canyon Dam.

**37. *Comment from U.S. Fish and Wildlife Service***

As detailed below and stated in section 7.5.4 of the CWA application, the Snake River is unique, and there are no pre-HCC reference data upon which to make valid comparisons with pre- and post- project conditions in the Snake River. The Snake River within and upstream of the HCC passes through many biomes and is subjected to numerous anthropogenic perturbations associated with agricultural, municipal, and hydroelectric activities. As such, no sites occur on other regional river systems that could serve as acceptable reference points for comparisons to assess conditions within the HCC. However, the selection of larger tributaries within the HCC action area should be pursued to determine their value as reference or control sites and to establish long-term monitoring sites and deemed appropriate. These include the Salmon, Grande Ronde, Imnaha, and Wildhorse rivers.

**ODEQ Response:**

ODEQ plans to work with IPC to determine what biological assessment model is most appropriate to the Snake River below Hells Canyon Dam. The assessment model may use waterbodies such as the Salmon, Grande Ronde, Imnaha, and Wildhorse rivers as reference sites. However, other assessment models will be considered.

**38. *Comment from U.S. Fish and Wildlife Service***

While none of these tributaries is subject to a comparable level of human disturbance, all share some physical characteristics similar to the Snake River in Hells Canyon that may make them useful as reference sites. Two or more of these tributaries should be considered for their use as reference sites for the additional monitoring components proposed below:

In addition to monitoring of standard macroinvertebrates (EPT), gastropods should also be included as part of any long-term monitoring effort. Much like EPT, gastropod taxa exhibit differing sensitivities to water quality and can provide a more thorough understanding of the aquatic community dynamics in the HCC.

Both mussels and the lamprey should be included in any long-term monitoring effort to investigate the use of the Snake River and selected tributaries by these sensitive taxa.

- Within the Snake River, establish several sample sites to monitor the long-term status of the rare hydrobiid snail *Taylorconcha insperata* in Hells Canyon. This species is only known to occupy habitats in the Snake River within Hells Canyon and portions of the Owyhee River Canyon. Periodic surveys will serve to monitor the species' status, and its presence should also be investigated in the Salmon River or other suitable tributaries.

**ODEQ Response:**

As described in this Evaluation and Findings report, ODEQ data indicates the macroinvertebrate, fish assemblage and periphyton conditions are poor at the two locations sampled in the Snake River. Additionally, literature indicates that rivers regulated by hydroelectric projects can lead to invertebrate assemblages that are ecologically unhealthy. Section IX of the water quality certification requires macroinvertebrate monitoring to determine whether this impairment continues. IPC may be required to develop an alternative measures plan if ODEQ determines the Project is continuing to impair health of the macroinvertebrate and periphyton communities. The macroinvertebrate monitoring is not intended to survey species presence in the Snake River and its tributaries. ODEQ will review the monitoring to determine if alternative measures are needed for reasonable assurance that project operations will be conducted in a manner that does not impair the macroinvertebrate and periphyton communities or other designated beneficial uses.

Gastropods fall within the description of macroinvertebrates cited in the water quality certification. ODEQ will review and approve the macroinvertebrate monitoring plan so the plan can include gastropod in the standard bioassessment metrics.

**39. *Comment from U.S. Fish and Wildlife Service.***

The methodologies, timing, and reporting of these and other macroinvertebrate monitoring efforts can be established by the IPC and its partners after issuance of the HCC FERC license.

**ODEQ Response:**

Section IX of the water quality certification requires IPC to submit to ODEQ for approval a macroinvertebrate and periphyton monitoring plan. The water quality certification does not require IPC to consult with other parties on development of the management plan. However, ODEQ is not precluded from consulting with other parties and may choose to share the monitoring plan and monitoring results with other parties.

## 10.4 Temperature

**40. *Comment from Burns Paiute Tribe***

The proposed certification will cause temperature impacts to listed species. The Burns Paiute Tribe joins other intervenors who raise this issue. Specifically, the Tribe joins the comments of the Shoshone-Bannock Tribe on this issue and incorporates those comments by reference with this letter.

**ODEQ Response:**

ODEQ acknowledges the comment.

**41. *Comment from Nez Perce Tribe***

First, ODEQ and IDEQ should require IPC to implement actions that reduce near term temperature relative to spawning criteria exceedances that will occur for 30 years while the Temperature Management and Compliance Plan ("TMCP") benefits take hold.

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. The water quality certification includes adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to mitigate or eliminate the temperature effect of the source on the water body. Additionally, the water quality certification requires IPC to implement the Brownlee Operational Component when the forecast indicates a high probability of exceeding 16.5 degrees Celsius. If water temperature in the Snake River below Hells Canyon Dam during salmonid spawning period exceeds 16.5° C in three consecutive years, IPC shall submit for the DEQs' approval an alternative measures report.

**42. *Comment from Nez Perce Tribe***

Second, ODEQ and IDEQ should require IPC to implement Plan B Hypolimnetic Pump System ("HPS") if spawning period temperature exceeds 16.5 in three consecutive years or in three out of five years.

**ODEQ Response:**

ODEQ considered this comment provided by the Nez Perce Tribe in its certification decision. Alternative measures / adaptive management is discussed in Section II.F.2, and ongoing monitoring and evaluation of information and data submitted by IPC will occur throughout the license term.

**43. *Comment from Shoshone Bannock Tribes***

The Tribes are notably concerned about the failure to mitigate for actual temperature issues for anadromous and resident fish below the facility. Under the current proposal, the States would allow seasonal fluctuations in the Snake River temperature regime that would range from 13-16 degrees Celsius at the point of compliance. Given that the initial position taken by the DEQ and other interested parties was to maintain a significantly lower temperature regime to protect the fall Chinook population in the Snake River, the Tribes have reservations about the information presented in the application. IPC presents a series of studies performed in laboratory settings to affirm their position that the existing flow regime does not appreciably reduce the likelihood of survival for all life stages of fall Chinook in the stretch below the HCC. It is notable that neither the DEQ's or IPC include measures to notably reduce the temperature below this structure when the very studies demonstrate that while the current temperature regime allows for spawning it is not optimal for anadromous fish. The loss of extensive cold water areas required by migratory cold water fish species may increase the risk of pre-spawn mortality because of

altered migration timing and a lack of necessary micro-refugia. A perfect example of how water quality can suppress a population by only providing for optimal spawning conditions for those fish tolerant of suboptimal temperatures; further depressing remaining fisheries.

The application and accompanying materials noted that there are some unknown variables that could be influencing survival rates below the HCC; however, those references are used to support the IPC application rather than being proposed for further study. The Tribes are not comfortable moving forward with the proposed criteria for temperature regimes below HCC without adequate assurances that the best available science has actually reviewed potential impacts in the study area. While it is common to merge studies together that cover the same general topic areas, it may be inappropriate to substitute this data for research that is targeted at the referenced spawning reach on the Snake River. While the Tribes may have particular disagreements over passage at the HCC, these are listed species impacted by a hydroelectric facility with a range of mitigation measures available to regulators and IPC. It should not be an acceptable practice to provide a certification for HCC based on the highest optimal range for cold-water biota without requiring significant on-site mitigation measures.

Other interested parties have continually noted a significant issue with the proposed temperature regimes in this application, and have requested specific compliance with the clear letter of the law in Oregon. One specific concern that has been noted is that the temperature regime proposed by IPC, under the best circumstances, is not any more protective of the listed stocks than the existing regime and in some instances may actually increase associated impacts to those stocks. IPC has proposed to increase the temperature thresholds at the point of compliance by proposing a variance of .3 degrees Celsius in spite of clear legal guidance to the contrary from Oregon and Idaho. It is understandable that a private entity would seek to maximize the profitable use of the facility with as little obligation as possible; however many of the interested parties would like to see some level of adherence to the principles of sound resource management and law.

**ODEQ Response:**

IPC proposed implementation of the Snake River Stewardship program to comply with the salmon spawning criterion of 13°C. ODEQ's authorization to allow insignificant additions of heat in waters that exceed the applicable temperature criteria is described in OAR 340-041-0028(12)(b). Recent monitoring data, like those recorded in 2014 and 2015, demonstrated brief periods in a few years at the onset of the spawning period where temperatures exceeded 17°C. IPC proposed implementation of the Brownlee operational component that, in conjunction with the SRSP, is expected to prevent water temperatures below the HCD in excess of 16.5°C. However, the 16.5°C is only a trigger for implementation of the Brownlee Operational Component, it is not a new criteria or a new proposed temperature regime for the Snake River below Hells Canyon Complex.

**44. *Comment from Washington Department of Ecology***

We continue to have the same concerns related to the upstream mitigation program that we communicated in our February 2017 letter on the 2017 draft §401 water quality certification. As we said then, "We recognize that the proposed restoration (upstream) is important, Ecology is skeptical that these efforts will ultimately result in attainment of temperature standards at the Washington border."

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The

TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

**45. *Comment from Washington Department of Ecology***

We want to see a certification that has definitive outcome based information so we can understand the impacts to Washington. If the data shows that there are still temperature impacts to our state then we feel there should be a clause in the certification that it can be reopened to address our downstream standards.

**ODEQ Response:**

The water quality certification addresses the proposed activities compliance with Oregon's water quality standards as required in Oregon Administrative Rules 340-048-0010(1). ORS 468B.040. ODEQ considered this comment in its certification decision. The purpose of the CWA is "to restore *and maintain* the chemical, physical, and biological integrity of the Nation's waters." 33 USC 1251(a). States have ongoing authority to ensure compliance with applicable standards.

**46. *Comment from Washington Department of Ecology***

It appears temperature compliance in this 401 effort is focused on overall watershed benefits primarily upstream of the HCC due to water quality concerns and uncertainty with releasing cold water from Brownlee Reservoir. NOAA Fisheries' view is the current summer/fall temperatures in the Hells Canyon reach are not a significant limiting factor for the recovery of salmon and steelhead. However, Washington is vested in, and is bearing a substantial burden associated with salmon recovery. Therefore, Washington is committed to ensuring downstream beneficial uses are protected and that temperature criteria are ultimately attained. Washington supports EPA's recommendation for Plan B trigger, if needed, to protect downstream beneficial uses, including the viability of salmon and steelhead populations. After the upstream program is implemented, it will be critical to accurately assess the extent to which temperature reductions are achieved below the HCC relative to the current baseline temperatures and criteria.

**ODEQ Response:**

ODEQ acknowledges the comment. Please note that EPA did not provide comments on the draft certification. ODEQ notes that alternative measures / adaptive management is discussed in Section II.F.2, and ongoing monitoring and evaluation of information and data related to temperature submitted by IPC will occur throughout the license term.

**47. *Comment from Washington Department of Ecology***

Additionally, an assessment of the potential water quality impacts associated with operating a Brownlee pump (i.e., Plan B alternative to the restoration approach) when such alternatives are needed, and can be safely deployed, should be another required component of this certification.

**ODEQ Response:**

Following the second five-year SRSP report, ODEQ may determine that alternative measures for temperature compliance are required (e.g., adaptive management). If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to prevent a violation of water quality standards.

**48. *Comment from Shoshone-Paiute Tribes***

The Tribes are quite concerned about the failure to mitigate for temperature issues that impact anadromous and resident fish below the project. Under the current proposal, the States would allow seasonal fluctuations in the Snake River temperature regime that would range from 13-16 degrees Celsius. The initial position taken by the DEQ and other interested parties was to maintain a temperature of 13 degrees C or lower to protect fall Chinook populations in the Hells Canyon Reach of the Snake River. IPC presents several laboratory studies to affirm their position that the existing flow regime does not appreciably reduce the likelihood of survival for all life stages of fall Chinook. However, it should be noted that the very studies presented demonstrate that the current temperature regime allows for spawning, but it is not optimal for anadromous fish. Unfortunately, the proposal does not list any measures to decrease the temperature to the optimal regime.

The application and accompanying materials noted that there are a multitude of unknown variables that could influence survival rates below the HCC; however, those references are used to support the IPC application rather than being proposed for further study. The Tribes have reservation with the concept of proceeding with the proposed criteria for temperature regimes below HCC, without the call for further and future research. Especially, given forecasts of future climate change and Though the Tribes have significantly different views on passage than IPC, there are multiple species of listed species below HCC that need to mitigated for including but not limited to Chinook Salmon and Bull Trout.

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

**49. *Comment from Upper Snake River Tribes Foundation***

To meet TMDL temperature load allocations, Idaho and Oregon salmonid spawning criteria, and Oregon's migration corridor temperature criteria, IPC must implement a Temperature Management and

Compliance Plan (TMCP) that is largely composed of the Snake River Stewardship Program (SRSP), and to a lesser extent the Brownlee Operation Plan. Under the TMCP, IPC will be given 15 years to attain half, and 30 years to attain all their thermal benefits at the inflow of the HCC from the SRSP, with Brownlee operation providing mitigation during years that are expected to exceed 16°C below Hells Canyon Dam. Because of the higher water temperatures observed above Hells Canyon in 2015, 2016, and 2017, we are increasingly concerned about the effectiveness of this temperature control program to provide any lasting water temperatures less than 16°C below Hells Canyon Dam. We support improvements made to upstream habitat which have a net benefit of reducing surface water temperatures and improving overall habitat, however, as previously stated, we disagree with allowing IPC up to 30 years to meet salmonid spawning temperature requirements. Chinook salmon and bull trout are already imperiled, allowing IPC to continue to violate temperature criteria for decades will only lead to further endangerment of the species.

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

**50. *Comment from Upper Snake River Tribes Foundation***

Reservoirs associated with the HCC total approximately 94 miles in length, are slow moving, and have little to no shaded areas. Due to these realities, there is significant doubt as to how much of the TMCP/SRSP thermal benefits produced in the Walter's Ferry to Homedale, Idaho stretch of the Snake River will be maintained downstream to the inflow of Brownlee Reservoir and through the HCC's three reservoirs, to the outflow of the Hells Canyon Dam, where salmonid spawning temperatures are currently not being met. USRT is supportive of any efforts that work to improve the Snake River and its tributaries (IPC has proposed restoration work on the following tributaries: Boise River, Brownlee Reservoir creeks, Burnt River, Malheur River, Middle Snake–Payette River, Owyhee River, Payette River, Pine Creek, Powder River, Succor Creek, and Weiser River), but have significant concerns that the thermal benefits IPC is claiming may not be realized. Much of any thermal reduction achieved will be lost in the open reservoir, potentially having little impact on the Snake River downstream of the Hells Canyon Dam.

**ODEQ Response:**

ODEQ considered the comments provided by the Upper Snake River Tribes Foundation; however, ODEQ respectfully disagrees. ODEQ finds a reasonable assurance that the proposed activities, as conditioned, may be conducted in a manner that will not violate the temperature standards. Portland State University developed temperature models to “explore the downstream

temperature impacts of Idaho Power Company's (IPC) temperature mitigation plan of their FERC Section 401 application for the Hells Canyon Complex (HCC). The key question being investigated was that though IPC's temperature mitigation plan (TEMP) would probably benefit local stream temperatures, how far are the cooling benefits transferred downstream?" (Berger 2009, Page 3). Berger (2009) noted, "IPC's TEMP mitigation projects reduce temperatures, but cooling benefits may be localized and it is uncertain how much temperatures at outflow of Hells Canyon Project are reduced" (Page 22). Since the TEMP program was initially proposed, IPC has proposed the Snake River Stewardship Program to address exceedance of the temperature criteria below Hells Canyon dam. To estimate loss of temperature benefit (attenuation) in the HCC reservoirs, IPC modeled temperature with the CE-QUAL-W2 reservoir models. Results indicated a loss of thermal reduction in the reservoirs of 39% to 53%, depending on flow year and modeled time frame. IPC applied an attenuation factor of 50% within Hells Canyon Complex, which is near the upper range of modeled results. IPC added this attenuation to the thermal benefits required, which resulted in required thermal benefits of 1191.6 billion kilocalories ("bkcal") at the inflow to the Project.

**51. *Comment from Upper Snake River Tribes Foundation***

USRT has met with IPC staff several times since the SRSP was first proposed and one of our recurrent, primary questions is: "to what degree does IPC have private landowner and State of Idaho buy-in to achieve the SRSP?" Currently, in our estimation, IPC has very little landowner buy-in. Additionally, it is unclear whether landowner buy-in will be achievable on the scale necessary to achieve significant reductions in temperature. While USRT questions the reasonable assurance standard that the SRSP will provide the thermal benefits required to meet temperature WQS requirements, we have even greater doubt that there is reasonable assurance that IPC can implement the SRSP due to landowner resistance.

**ODEQ Response:**

As noted in Section II.F.2 and II.F.4 of the water quality certification, IPC is required to submit five-year reports. After the second five-year report and any subsequent five-year report, ODEQ may determine that Temperature Alternative Measures are required (e.g., adaptive management). IPC shall then implement Plan B or other approved Temperature Alternative Measures if, taking into account projects implemented and to be implemented under the Snake River Stewardship Program, does not appear reasonably likely to achieve the 15 and 30 year required thermal benefits.

**52. *Comment from Upper Snake River Tribes Foundation***

Although the science appears to demonstrate that tolerance levels (13°-16° C) for the focal species may be higher than initially anticipated, it is noteworthy that Idaho Power seeks to implement a temperature regime that rises dangerously close to the point where higher levels of mortality occur. More research is needed to definitively support the temperature range. USRT would like to clearly state that we are unequivocally opposed to lowering the water quality standards associated with the HCC. It remains our position that the primary focus of the Certification process should be to create a workable solution that allows for the Snake River to be clean and cold for future generations.

**ODEQ Response:**

ODEQ considered the comments provided by the Upper Snake River Tribes Foundation; however, ODEQ respectfully disagrees. ODEQ has not lowered the water quality standards associated with the HCC, and ODEQ finds reasonable assurance that the proposed activities, as conditioned, may be conducted in a manner that will not violate the temperature standards.

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) ODEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to



develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

## 10.5 Snake River Stewardship Program

### 53. *Comment from Oregon Farm Bureau, Malheur Watershed Council, Malheur County Farm Bureau, Malheur Soil and Water Conservation District*

The Snake River Stewardship Program Must be Administered in a Transparent Manner and its Requirements Must be Clear to Participating Landowners. The 401 Certification also creates the Snake River Stewardship Program (SRSP), a water quality trading program designed to help IPC meet temperature requirements to comply with the Snake River-Hells Canyon Total Maximum Daily Load (“TMDL”). Water quality trading is relatively new in Oregon, with the formal program rules just developed a few years ago (OFB was part of the rulemaking), and only a few projects on the ground to date. As such, we will have concerns about ensuring that the program is transparent for landowners, does not have impacts on neighboring landowners, and does not result in agricultural land coming out of production.

First, the program must be transparent. As the program is relatively new, it’s critical that it is transparent to landowners who enroll in the program. They must know the duration of the commitment, what work will be completed, what access and long-term monitoring is required, how that data will be shared and who it will be shared with, as well as how any work may impact their operations. Further, the program must be designed and implemented in a way that ensures any effects from projects remain isolated the property of the landowner who enrolled in the program, and not impact neighboring landowners who choose not to enroll. Finally, the program should be designed so it does not take agricultural land out of production or reduce the viability of agricultural operations in the area.

#### **ODEQ Response:**

Idaho Power Company proposed the Snake River Stewardship Program to comply with the Snake River Hells Canyon TMDL load allocation, the salmonid spawning temperature criteria and migration corridor temperature criteria as described in Section II of the water quality certification. The SRSP includes in-stream habitat restoration projects in the mainstem Snake River and riparian revegetation projects in tributaries of the Snake River. IPC evaluated what areas have the potential for project implementation and determined that there are sufficient potential projects and associated thermal benefits to meet the requirements described in the water quality certification. IPC expects that a sufficient number of the projects will be feasible to implement depending on the willingness of landowners to participate in the program, known as recruitment. IPC defines “recruitment” as “The process of outreach and communication in order to enroll voluntary

landowners into contracts for the implementation and stewardship of SRSP projects on their property.” (June 2018 application, Exhibit 7.1-5 Page 7). As noted in the definition, the enrollment is voluntary and includes a contract between IPC and the landowner. The water quality certification does not address such contracts, and IPC is responsible for meeting its requirements in the water quality certification.

54. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited*

After years of articulating our concerns with ODEQ about IPC’s proposed TMCP and SRSP, including in the 2016 draft 401 petition, we are disheartened that the DEQ’s continue to endorse an approach that will not reasonably assure compliance with the temperature standards. We also note that the bkal requirements in this draft are actually lower than the 2016 draft petition. Please explain why this change occurred.

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

IPC proposed the Brownlee Operational Component that, in conjunction with the SRSP, is expected to address water temperatures below the HCD in excess of 16.5°C. IPC reviewed temperature data from 1996 to 2017 and noted that there were 4 years in the dataset when measured HCC outflow 7DAM was above 16.5°C. Using the forecasting method developed for the Brownlee Operational Component, IPC estimated that there were 7 years when a “reconstructed forecast” indicated a high probability that temperatures would exceed 16.5°C. IPC then adjusted the measured 7DAM temperature for 7 years out of the 27-year dataset. This “adjusted” temperature dataset resulted in a lower bkal requirement than in the 2016 draft certification. The final water quality certification requires IPC to attain thermal benefits of 1191.6 billion kilocalories at the inflow to the Project by 30 years after the date of FERC license issuance. The 2016 draft water quality certification required IPC to attain thermal benefits of 1211.6 billion kilocalories at the inflow to the Project by 30 years after the date of FERC license issuance.

55. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited*

Our primary concern with the TMCP remains the same as what we articulated in our comments on the 2016 draft petition: offsite mitigation may achieve the bkal reduction goal, but there is no evidence presented by IPC in its application that these measures will result in compliance with the temperature standards where they apply: below the Hells Canyon dam. Although localized, reach-scale thermal

reduction may be obtained through the SRSP, these efforts will simply not result in compliance with the temperature standards below the HCC within any meaningful time frame, if at all. Indeed, the temperature problems created by the HCC (delayed fall cooling, nonattainment of the Chinook spawning criterion, and delayed spring warming) are largely an engineered problem, derived from the presence and operation of the HCC itself, and therefore require an engineered solution in addition to watershed restoration measures.

The SRSP trading scheme will not result in compliance with the applicable temperature standards for the following reasons: 1) There is no reasonable assurance that IPC will be able to enlist the support of enough landowners in the tributaries and main stem upriver of the HCC to implement the SRSP within the timeframe set forth, within the license period, or for that matter, ever. IPC has not presented any evidence that it has secured any level of landowner cooperation to implement the SRSP. 2) If IPC is able to enlist the cooperation of enough landowners to implement the SRSP, there is no reasonable assurance the projects will result in the thermal reduction benefits predicted by IPC and required by ODEQ/IDEQ. Trees planted in riparian areas, particularly in this semi-arid and highly degraded environment, will likely have a poor rate of survival. There are no safeguards to protect the trees from grazing, either from livestock or other animals, agriculture or other activities. An aggressive monitoring plan is needed to ensure the survival of the planted trees. Further, if riparian plantings do survive to maturity, the thermal benefits will not be achieved for decades, if ever. However, it appears that IPC will be credited for those purported benefits much sooner. 3) Even if all projects are implemented and the required kcal reduction benefit is achieved, those benefits will attenuate and disappear either upstream of, or within, Brownlee Reservoir, and will have zero impact below the Hells Canyon dam where the temperature violations occur. Modeling by Portland State University demonstrated that it was not possible for thermal restoration in tributaries like the Boise River to produce sufficient benefit to address the temperature violations below Hells Canyon Dam (Berger et al 2009). Attenuation varies by flow, and IPC appears to have selected the flow that will result in the least thermal load responsibility.

**ODEQ Response:**

ODEQ considered the comments provided by American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, and Trout Unlimited however, ODEQ respectfully disagrees. ODEQ finds reasonable assurance that the proposed activities, as conditioned, may be conducted in a manner that will not violate the temperature standards.

Under Oregon Administrative Rules (OAR) 340-041-0028(2)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

As noted in Section II.F.2 and II.F.4 of the water quality certification, IPC shall submit five-year reports. Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

Portland State University developed temperature models to “explore the downstream temperature impacts of Idaho Power Company's (IPC) temperature mitigation plan of their FERC Section 401 application for the Hells Canyon Complex (HCC). The key question being investigated was that though IPC's temperature mitigation plan (TEMP) would probably benefit local stream temperatures, how far are the cooling benefits transferred downstream?” (Berger 2009, Page 3). Berger (2009) noted, “IPC's TEMP mitigation projects reduce temperatures, but cooling benefits may be localized and it is uncertain how much temperatures at outflow of Hells Canyon Project are reduced” (Page 22). Since the TEMP program was initially proposed, IPC has proposed the Snake River Stewardship Program to address exceedance of the temperature criteria below Hells Canyon dam. To estimate loss of temperature benefit (attenuation) in the HCC reservoirs, IPC modeled temperature with the CE-QUAL-W2 reservoir models. Results indicated a loss of thermal reduction in the reservoirs of 39% to 53%, depending on flow year and modeled time frame. IPC applied an attenuation factor of 50% within Hells Canyon Complex, which is near the upper range of modeled results. IPC added this attenuation to the thermal benefits required, which resulted in required thermal benefits of 1191.6 billion kilocalories (“bkcal”) at the inflow to the Project. ODEQ edited Section II.C.4 of the water quality certification to clarify the attenuation requirements.

**56. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited***

Describe Current Baseline Conditions and Collect Additional Temperature Data: If the SRSP is implemented in addition to “Plan B”, IPC should produce a system-wide baseline of stream channel and riparian conditions. This would include collecting a high resolution LiDAR remote sensing data set on the stream channel and riparian zone to provide an accurate estimate of riparian tree and shrub cover and height. Additionally, IPC should conduct thermal infrared remote sensing flights to document water temperatures throughout the major tributaries that will be relied on to provide thermal benefits. Without a baseline, there will be no way to know whether any progress is being made on a system level to improve water temperature.

**ODEQ Response:**

As noted in IPC Application Exhibit 7.1-5, “Aerial photography or light detection and ranging (LiDAR) data were used to establish current conditions and to highlight the potential acreage available for project implementation. This involved digitizing the areas of interest and evaluating the current vegetation or habitat (depending on the action) and modeling the current, “pre-project” thermal load. Acres available for restoration were then re-modeled to reflect a future, “post-project” condition” (Exhibit 7.1-5 of the June 2018 Application, Page 35).

Also noted in Exhibit 7.1-5, “All implemented project sites will also be monitored periodically via remote sensing (i.e., LiDAR, satellite imagery, drone flights, etc.). This method of monitoring allows for efficient tracking of projects spread over the broad geographic breadth of the SRSP, and provides a set of digitized images that allows for effective comparison of thermal benefit estimate data against actual conditions (i.e., land area for instream island/bank augmentation, tree height and density for riparian revegetation projects)” (Page 69). ODEQ edited Section II.E.2.a of the water quality certification to require IPC to provide the results of qualitative and remote effectiveness monitoring at all sites and quantitative (effectiveness) monitoring at selected sites.

**57. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited***

Coordination Between IPC and U.S. Army Corps Regarding Flow Augmentation to Benefit Water Temperatures in the Lower Snake River: While the draft 401 assessed water temperature in and around

the HCC, it does not discuss the impacts of releases from the HCC on temperature in the lower Snake or how those releases impact coldwater releases from Dworshak Dam. Releases from Dworshak Dam help to reduce temperatures in the Snake River but can be hampered by large releases of warmer water from the HCC. There is little to no coordination between IPC and the Corps of Engineers regarding outflows from Dworshak Dam and the HCC. Participation by IPC in the Technical Management Team meetings between June and September would help improve operations that lower temperature in the lower Snake River.

**ODEQ Response:**

When IPC implements the temperature water quality certification conditions, ODEQ has reasonable assurance that the Hells Canyon Complex will not cause or contribute to violations of applicable water quality standards, see Oregon Administrative Rules, chapter 340, division 41. IPC evaluated the impacts of release from due to the Brownlee Operational Component in Exhibits 7.1-2 and 7.1-3 of the June 2018 application for water quality certification. IPC also evaluated the “point of maximum impact” on temperature from the HCC in “Responses to Additional Information Request” dated March 11, 2011. ODEQ acknowledges your comment regarding participation by IPC in the Technical Management Team meetings, and notes that alternative measures / adaptive management is discussed in Section II.F.2, and ongoing monitoring and evaluation of information and data related to temperature submitted by IPC will occur throughout the license term.

**58. *Comment from Confederated Tribes of Umatilla Indian Reservation***

The CTUIR supports actions above (upstream from) the HCC to improve riverine, floodplain, and terrestrial habitats and practices occurring there that may result in lower downstream water temperatures. Nevertheless, we are concerned that the proposed actions may be insufficient to achieve the necessary measure of downstream temperature reductions, particularly given the apparently-accelerating pace of climate change impacts and the current retreat from serious attention by the federal government. Given that the results of the actions may be too attenuated over the distances involved and may take years, if not decades, to bear fruit, we remain concerned that applicable temperature water quality standards are likely to continue to be violated for an extended period absent additional proactive steps.

Habitat restoration work should be broad and comprehensive, extending beyond the river channel and into the floodplain and adjacent terrestrial environment that, cumulatively, all affect water quality and quantity. Monitoring and assessment of upstream actions should include measures of channel complexity (e.g., sinuosity) and geomorphic diversity in addition to riparian shade. A number of distinct riverine characteristics are important to healthy waterways and fish populations beyond just adequate riparian shade.

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

Instream restoration work, proposed as part of the Snake River Stewardship program, was designed to generate thermal benefits and yield habitat improvements for aquatic life. IPC Application Exhibit 7.1-5, describes the four specific instream restoration projects: 1) island enhancements, 2) island creation, 3) inset floodplains, and 4) emergent wetlands (some projects may contain two or even three of these actions in combination). As noted in Exhibit 7.1-5 “All of the proposed project types will alter the physical characteristics of the river channel by reducing channel width and increasing channel depth, with the goal of both generating thermal benefits and improving many of the natural river processes in the Snake River. These changes will also lead to increases in water velocities and channel scouring, and improve other channel forming processes” (Page 19).

**59. *Comment from Columbia River Intertribal Fish Commission***

Water temperature is an important environmental component that significantly affects fish health. The Project contributes to the thermal load of the river and Idaho Power is obligated to meet water quality standards for all salmonid life stages throughout the entire period of the Project’s license. The Snake River Stewardship Program (SRSP) has value, but it is contemplated that its benefits will not manifest for 15-30 years from now. Many facets of the SRSP are not reasonably certain to occur. There is no assurance that private landowners are supportive or willing to cooperate with essential elements of the program. The SRSP will not benefit or improve the condition of fish within or below the Project. The thermal benefit calculation is optimistic and does not take into account climate change shifts that will reduce the efficacy of the SRSP. This begs the question: what is DEQ willing to require right now to support the fisheries while the SRSP projects are being implemented?

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) ODEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

As noted in Section II.F.2 and II.F.4 of the water quality certification, IPC shall submit five-year reports. Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

As noted in the Section on Climate Change in this response to comment section, the riparian re-vegetation projects and the in river work proposed under the Snake River Stewardship program are expected to reduce peak temperatures in tributaries and increase carbon sequestration in the

tree biomass and soil. Additionally, IPC will implement the Brownlee Operational Component to address high temperatures (>16.5°C) forecasted in the Snake River below Hells Canyon Dam during the salmonid spawning period.

**60. *Comment from Columbia River Intertribal Fish Commission***

IPC has yet to demonstrate that (1) enough restoration projects are assured that the restoration will be effective in reducing water temperatures of HCD outflow, (2) thermal restoration can be accomplished in the timeframe of the license, (3) natural fall Chinook viability can be maintained during the timeframe in which restoration projects are sought, and (4) compliance with current WQS would occur within 30 years. NOAA's comments recognized similar concerns:

“However, we acknowledge that uncertainty exists regarding the effect of the altered temperature regime on Snake River fall Chinook survival and consider this to be a key information need that should be resolved through ongoing work and future studies. Additionally, Snake River temperatures are projected to increase due to global climate change in the coming decades. At present, it is uncertain how, or to what extent, the behavior of Snake River fall Chinook (migration timing, spawn timing, etc.) can accommodate these changes. This underscores the importance of continuing monitoring programs documenting passage timing, redd counts, and river temperatures in order to detect changes and assess their effects on fall Chinook salmon”. (p. 156, NOAA 2015).

NOAA has concerns about the ability of natural SR fall Chinook viability being sufficient to overcome sources of mortality. NOAA (2015) identified harvest as being one factor to consider, but its acknowledgement of the likely impacts of existing water temperatures makes this another source of impact to Chinook population viability. Regarding natural population viability, NOAA (2015, p. 272) states: “However, the observed growth is confounded by the large contribution of hatchery-origin fish from the supplementation program. It is unknown if the natural-origin fish can sustain themselves in the absence of hatchery fish. In addition, the observed population growth has occurred during a period of relatively high ocean survival, particularly in recent years. Thus, it is unknown if the natural-origin fish can sustain themselves through a broader range of ocean survival conditions.”

Current and anticipated ocean conditions (and by inference climate conditions) and the current status of SR fall Chinook are not sufficient bases to conclude that water temperature is not an important limiting factor to long-term viability of the population.

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

As noted in Section II.F.2 and II.F.4 of the water quality certification, IPC shall submit five-year reports. Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water

quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

**61. *Comment from Nez Perce Tribe***

While the Tribe can support restoration initiatives such as the proposed SRSP to improve water quality conditions upstream of the HCC, the Tribe believes the SRSP is simply a tool. The existence of the SRSP cannot substitute for IPC's responsibility to fully comply with all water quality standards. This responsibility includes meeting all applicable water quality standards to protect fish downstream of the HCC. Achieving and maintaining suitable water temperatures for salmonid spawning downstream of the Hells Canyon Dam is vitally important for the long-term productivity and potential viability of Snake River fall Chinook spawning and rearing. The IPC 401 Application is based on the EPA and Oregon spawning temperature criteria of 13 degrees. Idaho has petitioned EPA for a higher site specific spawning criteria of 14.5 degrees. The Tribe opposes adoption of the 14.5 degree site specific criteria by EPA, and rejects the IPC notion that the 14.5 criteria would someday be the measure of temperature obligations under this application without additional review. Furthermore, the IPC application aims to relax spawning temperature criteria by 0.3 degrees to account for anthropogenic influences, making the actual criteria 13.3 (or 14.8) degrees. The 13 degrees Celsius standard is not currently being met downstream of the Hells Canyon Dam and current downstream temperatures appear to be borderline for functional or suitable habitat (fish survival) related to spawning criteria. This is highly concerning in light of the fact that water temperatures in the Snake River have been increasing and may continue to increase due to climate change. There have already been three consecutive years-2014 to 2016-of average maximum temperatures above 16 degrees Celsius between October 23 and 29. Laboratory studies indicate that egg viability (post spawning) is compromised when water temperatures approach and exceed 16 degrees Celsius. For this reason, current water temperatures downstream of the Hells Canyon Dam simply cannot continue to exceed 16 degrees Celsius without having deleterious effect on fish species. IPC maintains that the initiatives contained in the proposed SRSP will produce sufficient thermal benefits to achieve the TMDL temperature allocation downstream of Hells Canyon Dam and therefore will reasonably assure water quality compliance under the new license. EPA and others, however, have raised substantial questions and concerns regarding the anticipated thermal benefits of the SRSP. For this reason, the Tribe would also like ODEQ and IDEQ to require IPC to identify additional instream projects and be ready to implement them no later than ten years after the license is reissued. The Tribe further asks that ODEQ and IDEQ require IPC to coordinate with the Tribe on any watershed restoration projects occurring within the Tribe's exclusive use area, as adjudicated by the Indian Claims Commission. Regardless of how the SRSP performs, IPC is ultimately responsible for meeting all applicable water quality standards for the new license. Consequently, if the predicted SRSP benefits prove to be insufficient-not an unreasonable prospect in light of the substantial uncertainties regarding attenuation, changing environmental conditions, and landowner involvement-then ODEQ and IDEQ must prevent IPC from continuing to violate water quality standards during the new license term by putting strong, prescriptive safeguards and contingencies in the 401 certifications. Putting these safeguards in place prior to water quality standard exceedances will prevent IPC and the states from scrambling to identify mitigation options after water quality standards have been violated and thus are critical to ensuring all applicable water quality standards are continually met throughout the license term.

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) ODEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of



measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

As noted in Section II.F.2 and II.F.4 of the water quality certification, IPC shall submit five-year reports. Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards. ODEQ also notes that EPA did not provide comments on the draft water quality certification.

**62. *Comment from Nez Perce Tribe***

Add new required action(s) (II.A.3) for temperature relative to criteria exceedances that will occur for 30 years while the Temperature Management and Compliance Plan ("TMCP") benefits take hold. One potential action could be annual implementation of the Brownlee operational component (Fall draft) which is already being required under Section II.C.6 for years with forecasted temperatures exceed 16.5 degrees C. Alternatively, Plan B (HPS) could be required for implementation during the first 30 years of the permit and then discontinued after TMCP thermal benefits are realized/confirmed.

**ODEQ Response:**

The water quality certification requires IPC to implement alternative measures if the water temperature in the Snake River below Hells Canyon dam during salmonid spawning period exceeds 16.5°C in three consecutive years. This trigger ties to the salmonid life cycle; therefore, at this time and based on the available information, ODEQ finds the trigger is sufficient to protect water quality.

**63. *Comment from National Marine Fisheries Service***

Temperatures in the Snake River are affected by numerous factors, including the existence and operation of the Hells Canyon Complex dams (especially Brownlee Dam). NMFS is also keenly aware of the threat posed to ESA-listed salmon and steelhead by increasing temperatures related to climate change (see Snake River salmon and steelhead recovery plans at [www.westcoast.fisheries.noaa.gov](http://www.westcoast.fisheries.noaa.gov)). Idaho Power Company's proposed Temperature Management and Compliance Plan (TMCP), especially the Snake River Stewardship Program (SRSP), should positively affect the thermal regime of the Snake River. The timely implementation of the SRSP should improve the resiliency of the Snake River to expected climate change effects. Though some uncertainty remains with respect to the overall efficacy of the program, this uncertainty is outweighed by the risk associated with continuing to delay the issuance of the Section 401 Certifications and the implementation of related mitigation measures to reduce temperature that would be required elements in a new license. In addition, the SRSP should greatly improve the habitat function for native species in a large reach of the Snake River upstream of the Hells Canyon project.

**ODEQ Response:**

ODEQ acknowledges the comment.

**64. *Comment from Shoshone Bannock Tribes***

The pollution trading methods outlined in the application (i.e. upstream habitat projects in Oregon and Idaho) are uncertain to occur and even if fully implemented would not have an appreciable impact on temperatures below the facility. Restoring river processes is an important component of effective natural

resource management and it is understandable that IPC would offer off-site mitigation measures to Idaho and Oregon in an effort to obtain a certification for the HCC. It is germane to point out that the bulk of water quality impacts in the Snake River system (both in Oregon and Idaho) are related to the development of the contemporary hydro- system. It is also important to note that even under the best scenarios, any realized benefits would be naturally attenuated upstream of the HCC.

**ODEQ Response:**

ODEQ respectfully disagrees with this comment. Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) ODEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

As noted in Section II.F.2 and II.F.4 of the water quality certification, IPC shall submit five-year reports. Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

Portland State University developed temperature models to “explore the downstream temperature impacts of Idaho Power Company's (IPC) temperature mitigation plan of their FERC Section 401 application for the Hells Canyon Complex (HCC). The key question being investigated was that though IPC's temperature mitigation plan (TEMP) would probably benefit local stream temperatures, how far are the cooling benefits transferred downstream?” (Berger 2009, Page 3). Berger (2009) noted, “IPC's TEMP mitigation projects reduce temperatures, but cooling benefits may be localized and it is uncertain how much temperatures at outflow of Hells Canyon Project are reduced” (Page 22). Since the TEMP program was initially proposed, IPC proposed the Snake River Stewardship Program to address exceedance of the temperature criteria below Hells Canyon dam. To estimate loss of temperature benefit (attenuation) in the HCC reservoirs, IPC modeled temperature with the CE-QUAL-W2 reservoir models. Results indicated a loss of thermal reduction in the reservoirs of 39% to 53%, depending on flow year and modeled period. IPC applied an attenuation factor of 50% within Hells Canyon Complex, which is near the upper range of modeled results. IPC added this attenuation to the thermal benefits required, which resulted in required thermal benefits of 1191.6 billion kilocalories (“bkcal”) at the inflow to the Project. Additionally, IPC notes, “In other words, in-river and tributary project thermal benefits will be reduced by 22% and 25%, respectively, before being applied or credited toward the aggregate thermal load target of 1191.6 bkcal at the HCC inflow. (June 2018 Application, Page 168). ODEQ edited Section II.C.4 of the water quality certification to clarify the attenuation requirements.

**65. Comment from Washington Department of Ecology**

We continue to have the same concerns related to the upstream mitigation program that we communicated in our February 2017 letter on the 2017 draft §401 water quality certification. As we said then, “We

recognize that the proposed restoration (upstream) is important, Ecology is skeptical that these efforts will ultimately result in attainment of temperature standards at the Washington border".

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) ODEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

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**66. *Comment from Washington Department of Ecology***

While it is recognized that the proposed restoration is important, Ecology is also skeptical that these efforts will ultimately result in attainment of temperature standards at the Washington border. The proposed trading program outlined is not designed to meet the downstream standards, but rather Idaho and Oregon's portion of the watershed impacts. Another concern is about how the trading aspects of the proposed program could set a precedent for other trading programs in the region. Our comments on the draft 401 are specific to the protection of our downstream standards focusing on its trading aspects in

particular. Due to the complexities in the methods used to establish the thermal reduction requirements and provide credits to projects, we agree with EPA's statement in their letter that " ... the thermal crediting approach is quite novel, unique to the HCC environmental setting and is not transferable to more typical temperature trading approaches".

**ODEQ Response:**

ODEQ notes that EPA did not provide comments on the draft water quality certification. Under Oregon Administrative Rules (OAR) 340-039, ODEQ may approve water quality trading if it promotes specified EQC policies. The SRSP was found to be consistent with water quality trading objectives set forth in OAR 340-039-0003.

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) ODEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

As noted in Section II.F.2 and II.F.4 of the water quality certification, IPC shall submit five-year reports. Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

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**67. *Comment from Washington Department of Ecology***

Accountability of Restoration Effectiveness - Inclusion of a statement of information obtained from the quantitative monitoring will be used to adjust thermal benefits for projects already modeled and counted toward the offset.

**ODEQ Response:**

ODEQ acknowledges that there will be learning curve for IPC while implementing the Snake River Stewardship program and associated projects. ODEQ notes that some projects may produce lower temperature benefits than predicted. However, other projects may produce higher temperature benefits than predicted. ODEQ finds it is appropriate to use monitoring information from implemented projects to adjust temperature benefits only for future projects. The kcal requirement includes a 10% margin of safety, which addresses uncertainty.

**68. *Comment from Washington Department of Ecology***

A statement needs to be included in the 401 certification that no thermal benefits associated with previously implemented projects; which were not previously quantified, including any benefits unquantified due to a lack of data or recognized methodology, will not be counted until both ODEQ and IDEQ have approved the data and methodology for determining such benefits, and the proposal has been presented to the public for review and comment.

**ODEQ Response:**

Section II.E.4.g. in the water quality certification requires IPC to provide a summary of thermal benefits associated with projects that were not previously quantified. New benefits will only be counted toward meeting the required thermal benefits if ODEQ, after consultation with IDEQ, approves the data and methodology for determining the benefits.

**69. *Comment from Washington Department of Ecology***

The method used to calculate the heat load reduction necessary used an average heat load applied over the critical period. However, achieving just the average heat load reduction will not achieve compliance with the temperature criteria.

**ODEQ Response:**

As described in Section 6.1.2.3.2.1 of the June 2018 application for water quality certification, for each year in the 27 year period of temperature data collection, thermal load exceedances above the numeric 7 day moving average of the daily maximum spawning criteria (13.3°C) were calculated for the period when the HCC outflow temperature was above the salmonid spawning criteria. Beginning October 29 of each year measured HCC outflow temperature data was compared to the numeric 7DAM salmonid spawning criterion (i.e. 13.3°C). The measured temperature exceedance on each day over the duration for each year was combined with the average HCC outflow volumes on that day to calculate a daily thermal load exceedance. IPC Application Exhibit 6.1-3 summarized the daily load exceedance for each year. ODEQ finds the use of the seven day moving average of the daily maximum temperature is appropriate because the spawning criterion is defined using this statistic.

**70. *Comment from Washington Department of Ecology***

Thermal reduction credits will apparently be counted as soon as a project is implemented. For projects that involve riparian restoration to improve river shading, there will be no benefit until trees have grown large enough to shade the channel, so no thermal reduction should be counted until the time that the benefit is realized.

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-039, ODEQ may approve water quality trading if it promotes specified EQC policies. The SRSP was found to be consistent with water quality trading objectives set forth in OAR 340-039-0003.

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

As noted in Section II.F.2 and II.F.4 of the water quality certification, IPC shall submit five-year reports. Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

As noted in IPC Application Exhibit 7.1-5, “The thermal benefits modeled for SRSP restoration projects assume that those projects are maintained and successfully function into the future. As such, it is essential to monitor the progress of these projects towards achieving modeled future conditions for thermal benefits and ecological improvements over the duration of the SRSP. To confirm that the program remains on a trajectory toward success, monitoring for the SRSP will follow a three-tiered approach, including: 1) rapid qualitative monitoring on thermal benefit project sites, 2) remote effectiveness monitoring of the SRSP program area, and 3) quantitative confidence monitoring on a sample of project sites” (Exhibit 7.1-5, Page 69).

**71. *Comment from Washington Department of Ecology***

Washington disagrees with the approach for setting baselines for the purposes of trading.

**ODEQ Response:**

ODEQ respectfully disagrees with this comment. “Regulatory baseline” refers to land management obligations applicable to the project site at the time that the SRSP actions are implemented. Compliance with those requirements must be documented to the DEQs before any thermal benefits from the implemented restoration actions can be counted toward the cumulative thermal load exceedance. Credits will be counted for those water quality benefits a project generates above the baseline. The definition and application of baseline for the Snake River Stewardship program meets the requirements for baseline as defined in Oregon Administrative Rules (OAR) 340-039-0005(6).

**72. *Comment from Washington Department of Ecology***

Thermal benefits will be counted based on modeling and not on actual monitoring of the thermal improvements achieved. This is stated quite clearly in the 401 application:

"Information obtained from the quantitative monitoring will be used to inform the thermal benefit calculation, implementation, and maintenance of future projects but will not be used to adjust thermal benefits already modeled and counted toward the offset." We think that in order for a trading program to be credible real monitoring on the effects of the traded projects is an essential component to a trading program.

**ODEQ Response:**

ODEQ acknowledges the comment, and agrees that credible monitoring on the effects of the traded projects are an essential component of a trading program. Accordingly, Section II.E.2.a of the water quality certification requires IPC to provide the results of qualitative and remote effectiveness monitoring at all sites and quantitative (effectiveness) monitoring at selected sites. This certification has monitoring inform calculation of thermal benefits associated with only future projects though, because ODEQ acknowledges that there will be learning curve for IPC while implementing the Snake River Stewardship program and associated projects. ODEQ notes that some projects may produce lower temperature benefits than predicted. However, other projects may produce higher temperature benefits than predicted. ODEQ believes that it is appropriate to use monitoring information from implemented projects to adjust temperature benefits only for future projects.

## 10.6 Brownlee Operational Component

**73. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited***

We support the Brownlee operational component to help achieve compliance with temperature criterion because it can have an immediate effect on downstream river temperatures. We also support the associated monitoring and reporting requirements of this component.

**ODEQ Response:**

ODEQ acknowledges the comment.

**74. *Comment from Confederated Tribes of Umatilla Indian Reservation***

While the Brownlee Operational Component appears helpful, it may not fully meet the entire range of criteria established to protect fish. Additional modeling should be done to examine what is necessary to meet all standards, for all salmonid life stages. Whether to install a pump to provide cooling water should be based on current water quality criteria. The natural seasonal thermal pattern (NSTP) should also be recognized and factored into how the Brownlee Operational Component is implemented.

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

As noted in Section II.F.2 and II.F.4 of the water quality certification, IPC shall submit five-year reports. Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

**75. *Comment from Columbia River Intertribal Fish Commission***

The Brownlee Operational Component (BOC) will provide needed thermal protection to Snake River fall Chinook during the designated spawning season but will not help IPC meet current water quality criteria for temperature in the spawning period. The current criteria is 13°C, but as proposed, the operation would attempt to lower instream temperatures only when pre-spawning season forecasts are greater than 16.5°C, which is dangerously close to the lethal threshold for fall Chinook embryos. The management threshold should therefore be consistent with the current water quality criteria for spawning salmon, 13°C. Additional model runs should investigate Brownlee draft scenarios to achieve current water quality criteria. Also, the decision to install a hypolimnetic pump should be based on the current water quality criteria, 13°C, not the operation's effectiveness to cool water to 16.5°C.

**ODEQ Response:**

IPC proposed implementation of the Snake River Stewardship program to comply with the salmon spawning criterion of 13°C. ODEQ's authorization to allow insignificant additions of heat in waters that exceed the applicable temperature criteria is described in OAR 340-041-0028(12)(b). Recent monitoring data, like those recorded in 2014 and 2015, demonstrated brief periods in a few years at the onset of the spawning period where temperatures exceeded 17°C. IPC proposed implementation of the Brownlee operational component that, in conjunction with the SRSP, is expected to prevent water temperatures below the HCD in excess of 16.5°C. However, the 16.5°C is only an established trigger for implementation of the Brownlee Operational Component, it is not a new criteria or a new proposed temperature regime for the Snake River below Hells Canyon Complex.

The water quality certification requires IPC to implement alternative measures if the water temperature in the Snake River below Hells Canyon dam during salmonid spawning period exceeds 16.5°C in three consecutive years. This trigger ties to the salmonid life cycle; therefore, at this time and based on the available information, ODEQ finds the trigger and such adaptive management is sufficient to protect water quality.

The Brownlee operational component is included as a mitigation measure for years where temperatures are expected to exceed 16.5° C in the interim until the SRSP is fully implemented. This is not a new standard for the Snake River and does not supplant the current criteria. In retrospect, use of the term "target" in referring to 16.5 degrees C is not wholly accurate, because 16.5 degrees C is more akin to a trigger for fall drafting or alternative measures, or both, if temperatures exceed 16.5 degrees C in three consecutive years.

**76. *Comment from Columbia River Intertribal Fish Commission***

The Brownlee Operational Component is a good contribution to IPC's Temperature Management Plan (TMP), but the operation alone is not designed to help the company achieve water quality compliance. It is a type of fail-safe operation to protect fall Chinook embryos and young of the year from catastrophe in the event that water temperatures exceed of 16.5°C, a critical threshold. The goal of the operation is to cool HCC outflows and remain below 16.5°C as a 7DAM temperature during the salmonid spawning period. The operational component would rely on results of a temperature forecast model prior to salmon



spawning. If 16.5°C exceedances are predicted by the model, Brownlee reservoir would be drafted in the Fall to provide cooler water to the spawning grounds downstream. The plan, if approved, would also lower the number of thermal units IPC would be required to provide with its stewardship program.

The operational component should not be mistaken as a mechanism for IPC to meet current water quality criteria for temperature in the spawning period – it will not. In its application, IPC proposes that if temperatures exceed 16.5°C for three consecutive years, DEQ may require them to implement an alternative or supplemental measure to meet the goals of the Brownlee operational component. And, “IPC reserves the right to consider augmenting the Brownlee operational component with a modified, smaller, HPS to maintain the 7DAM spawning temperature below 16.5°C if the Brownlee operational component proves to be ineffective in the future.”

The current water quality criteria is 13°C 7DAM for spawning salmon, but as proposed, the operational component would attempt to lower instream temperatures only when pre-spawning season forecasts exceed 16.5°C 7DAM, which is dangerously close to the lethal threshold for SRFC embryos. The management threshold should be consistent with the current water quality criteria, 13°C. Additional model runs should investigate Brownlee draft scenarios to achieve current water quality criteria. Also, the decision to install a hypolimnetic pump should be based on the current water quality criteria for spawning salmon, 13°C, not the operational component’s effectiveness to reach 16.5°C.

**ODEQ Response:**

IPC proposed implementation of the Snake River Stewardship program to comply with the salmon spawning criterion of 13°C. ODEQ’s authorization to allow insignificant additions of heat in waters that exceed the applicable temperature criteria is described in OAR 340-041-0028(12)(b). Recent monitoring data, like those recorded in 2014 and 2015, demonstrated brief periods in a few years at the onset of the spawning period where temperatures exceeded 17°C. IPC proposed implementation of the Brownlee operational component that, in conjunction with the SRSP, is expected to prevent water temperatures below the HCD in excess of 16.5°C. However, the 16.5°C is only an established trigger point for implementation of the Brownlee Operational Component, it is not a new criteria or a new proposed temperature regime for the Snake River below Hells Canyon Complex.

The water quality certification requires IPC to implement alternative measures if the water temperature in the Snake River below Hells Canyon dam during salmonid spawning period exceeds 16.5°C in three consecutive years. This trigger ties to the salmonid life cycle; therefore, at this time and based on the available information, ODEQ finds the trigger and such adaptive management is sufficient to protect water quality.

The Brownlee operational component is included as a mitigation measure for years where temperatures are expected to exceed 16.5° C in the interim until the SRSP is fully implemented. This is not a new standard for the Snake River and does not supplant the current criteria. In retrospect, use of the term “target” in referring to 16.5 degrees C is not wholly accurate, because 16.5 degrees C is more akin to a trigger for fall drafting or alternative measures, or both, if temperatures exceed 16.5 degrees C in three consecutive years.

**77. *Comment from Nez Perce Tribe***

Add new required action(s) (II.A.3) for temperature relative to criteria exceedances that will occur for 30 years while the Temperature Management and Compliance Plan ("TMCP") benefits take hold. One potential action could be annual implementation of the Brownlee operational component (Fall draft) which is already being required under Section II.C.6 for years with forecasted temperatures exceed 16.5

degrees C. Alternatively, Plan B (HPS) could be required for implementation during the first 30 years of the permit and then discontinued after TMCP thermal benefits are realized/confirmed.

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

As noted in Section II.F.2 and II.F.4 of the water quality certification, IPC shall submit five-year reports. Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

**78. Comment from National Marine Fisheries Service**

NMFS has concern with respect to the Brownlee Operation Plan, which aims to evacuate Brownlee reservoir, starting in September, in order to pass through cooler inflowing water and reduce Hells Canyon Dam outflow temperatures to 16.5° C during the salmonid spawning period (late October and November). We agree that the operation would likely improve temperatures for early spawning fall Chinook salmon. We are, however, concerned that evacuation of this water starting in September could have negative consequences for adult fall Chinook and steelhead.

First, this operation could put at risk the fall Chinook spawning program that has, for over two decades, provided stable, protective flows of between 8,500 13,500 cfs for spawning and incubating fall Chinook salmon. The continuation of this operation in order to recover fall Chinook salmon was specifically identified as an important conservation action in the Snake River fall Chinook salmon recovery plan. It appears that minimum targeted spawning flows may be reduced as a result of this operation, potentially reducing the amount of available spawning habitat (e.g., if resulting flows were to drop below 8,500 cfs). Second, the release of larger volumes of warm water from Brownlee reservoir could reduce the efficacy of cool-water releases from Dworshak Dam in September - increasing temperatures in the lower Snake River (downstream of the Snake and Clearwater River confluence) and potentially exposing adult fall Chinook and steelhead to higher temperatures as they migrate upstream.

**ODEQ Response:**

The water quality certification was based upon evaluation of IPC's proposed operations, which are set forth in Exhibit A of that certification. IPC proposes project outflows of 8,500 cfs to 13,500cfs downstream of Hells Canyon Dam for fall Chinook from 2nd Monday in October to 2nd Friday in December, and it identifies the potential necessity of consultation with NMFS, see footnote 6 of Exhibit A. In IPC's Application in Exhibit 7.1-1, IPC factored operational requirements including fall Chinook stable spawning flow at 8,500 cfs into its baseline scenario in its models. Further, FERC found in the present FEIS that, based on the implementation of the

fall Chinook spawning program since 1991, flows of 8,500-13,500 cfs provide near optimal conditions for spawning fall Chinook and that providing stable flows anywhere in this range would minimize the potential for redd superimposition. ODEQ notes that ODFW agreed with FERC's assessment; and in its 10(j) recommendations, ODFW recommended that flows remain stable and not decrease below 8,000cfs during fall Chinook spawning. Instead, it is projected that, if IPC implements the BOC, it would not increase flow (and power generation) after the end of the fall Chinook spawning period (Exhibit 7.1-1, Figure 10) as it would under normal operations.

ODEQ acknowledges that increased drafting of Brownlee reservoir under the Brownlee Operational Component may result in increased flows downstream of HC Dam. IPC performed modeling to assess the extent of this effect at two locations in the lower Snake, Anatone (downstream of the Salmon River confluence) and below Lower Granite Dam (downstream of the Clearwater River confluence and Dowarshak Dam). ODEQ concurs with IPC's model approach. IPC's model indicates that implementation of the Brownlee Operational Component would increase temperatures at Anatone, but not by very much (i.e. ~0.3 degrees C, increasing time above 20 degrees C by 1 day). IPC's model indicates that implementation of the Brownlee Operational Component would increase temperatures below Lower Granite Dam by a more significant amount (~1.2 degrees C). This increase would not likely cause exceedance of temperature criteria for salmon migration (20 degrees C).

ODEQ acknowledges NMFS' comment that the projected temperature increase could affect fall Chinook in the lower Snake River. However, it is difficult to assess the extent of the potential impact to the fall Chinook population as a whole or portions of the population that may be using the lower Snake River at that time. Increased time that fall Chinook are exposed warm temperatures can affect their spawning success and egg viability. However, it is possible that the benefits to fall Chinook of cooler water during spawning in the Hells Canyon reach could outweigh the impact of warmer water during migration lower in the Snake River. Additional years of data are necessary to refine the model projections, and adaptive management may be necessary, including but not limited to modeling impacts beyond the end of fall Chinook spawning and into incubation, emergence and rearing during the following spring, or increase spatial scope of the analysis, or both, to more fully understand the potential impact of the Brownlee Operational Component. The water quality certification includes sufficient adaptive management provisions to provide reasonable assurance of compliance with applicable standards and protect designated uses.

#### **79. *Comment from National Marine Fisheries Service***

Achieving the 16.5° C spawning criteria temperature through this operation has the potential to harm the health and productivity of SR fall Chinook salmon and steelhead compared to the existing temperature regime. NMFS recommends that the final 401 certifications include (1) an analysis of the potential negative impacts that could result; and (2) the inclusion of an adaptive management process to guide the annual implementation of this operation throughout the period of the new license which explicitly (1) considers the potential tradeoffs for fall Chinook salmon and steelhead, (2) considers the outcome of previous attempts to implement this operation on the fall Chinook spawning program and lower Snake River temperatures, and (3) requires coordination with relevant federal agencies (e.g., the Corps of Engineers, NMFS, U.S. Fish and Wildlife Service) and concerned tribes.

#### **ODEQ Response:**

IPC proposed implementation of the Snake River Stewardship program to comply with the salmon spawning criterion of 13°C. ODEQ's authorization to allow insignificant additions of heat in waters that exceed the applicable temperature criteria is described in OAR 340-041-0028(12)(b). Recent monitoring data, like those recorded in 2014 and 2015, demonstrated brief

periods in a few years at the onset of the spawning period where temperatures exceeded 17°C. IPC proposed implementation of the Brownlee operational component that, in conjunction with the SRSP, is expected to prevent water temperatures below the HCD in excess of 16.5°C. However, the 16.5°C is only an established trigger for implementation of the Brownlee Operational Component, it is not a new criteria or a new proposed temperature regime for the Snake River below Hells Canyon Complex.

The water quality certification does not limit who may be consulted in the future regarding the reported information and data and/or adaptive management.

**80. *Comment from Washington Department of Ecology***

Oregon's latest draft §401 certification relies on a new Brownlee operational component proposed by Idaho Power (IPC) to mitigate for fall temperatures predicted to exceed 16.5°C. In the technical memorandum estimating the downstream effects of these increased flow operations, IPC notes that while increased fall flows may cool water from the HCC, the increased quantity of water could result in warmer conditions below the Salmon and Clearwater rivers. These estimated effects are concerning to Washington and the implication it may have on increase warming and compliance with our Snake River temperature standards.

The U.S. Army Corps of Engineers (Corps) is required to regulate outflows temperatures from the Dworshak Dam to increase cool water to the Clearwater River so that Snake River temperature criteria can be maintained at the Lower Granite.dam tailwater. This reasonable and prudent alternative required by the federal biological opinion is an important factor to moderating increased late summer and fall temperatures in the Snake River. We appreciate the effort by IPC to estimate the Snake River impacts using the flow weighted mass balance method, however, this analysis should be further developed and the potential impacts better modeled. Improved modeling will assist us with understanding the impacts of higher fall flows from the HCC.

This new addition to Brownlee dam operations in the IPC application and draft §401 certification, coupled with the concerns we have related to the upstream mitigation, makes us question whether Washington water quality is going to be impacted by this §401 water quality certification decision. Cool water in the Snake River is critical for salmon survival, so we are sending these comments in order to request that Oregon move forward in a cautious manner that does not create further warming in the Snake River for which there would be no regulatory action available to remedy. Although we remain skeptical of the Temperature Alternative Measures Plan achieving the necessary cooling downstream of Brownlee Dam and have concerns on the impacts associated with the Brownlee operational component, we are willing to stand aside and rely on adaptive management to determine if that skepticism is well- placed or not. To ensure that IPC and Oregon have the tools necessary to adaptively manage temperature issues in the Snake River, we are specifically requesting that the final §401 certification issued by Oregon do the following:

Condition that Temperature Management and Compliance Plan to include a thorough peer reviewed analysis of the impacts the Brownlee operational component will have on meeting WA state temperature criteria at the Washington-Idaho-Oregon border as well as downstream of the Clearwater confluence.

**ODEQ Response:**

ODEQ considered this comment in its certification decision. IPC proposed implementation of the Snake River Stewardship program to comply with the salmon spawning criterion of 13°C.

ODEQ's authorization to allow insignificant additions of heat in waters that exceed the applicable temperature criteria is described in OAR 340-041-0028(12)(b). Recent monitoring data, like those

recorded in 2014 and 2015, demonstrated brief periods in a few years at the onset of the spawning period where temperatures exceeded 17°C. IPC proposed implementation of the Brownlee operational component that, in conjunction with the SRSP, is expected to prevent water temperatures below the HCD in excess of 16.5°C. However, the 16.5°C is only an established trigger point for implementation of the Brownlee Operational Component, it is not a new criteria or a new proposed temperature regime for the Snake River below Hells Canyon Complex.

The water quality certification requires IPC to implement alternative measures if the water temperature in the Snake River below Hells Canyon dam during salmonid spawning period exceeds 16.5°C in three consecutive years. This trigger ties to the salmonid life cycle; therefore, at this time and based on the available information, ODEQ finds the trigger and such adaptive management is sufficient to protect water quality.

The water quality certification addresses the proposed activities compliance with Oregon's water quality standards as required in Oregon Administrative Rules 340-048-0010(1). ORS 468B.040. The purpose of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 USC 1251(a). States have ongoing authority to ensure compliance with applicable standards.

**81. *Comment from Washington Department of Ecology***

Condition that IPC submit for Oregon's approval, a data summary and report of the impacts to downstream temperatures in the year following the use of the Brownlee Dam operational alternative.

**ODEQ Response:**

Section II. E of the water quality certification requires IPC to submit annual reports on the Brownlee Operational Component and the SRSP. Included in the report will be a report of daily maximum temperature measure within three miles downstream of Hells Canyon Dam. Additional data is available at the USGS gages mentioned above and could be used to analyze temperature further downstream in the Snake River.

When IPC implements the temperature water quality certification conditions, ODEQ has reasonable assurance that the Hells Canyon Complex will not cause or contribute to violations of applicable water quality standards, see Oregon Administrative Rules, chapter 340, division 41. IPC evaluated the impacts of release from due to the Brownlee Operational Component in Exhibits 7.1-2 and 7.1-3 of the June 2018 application for water quality certification. IPC also evaluated the "point of maximum impact" on temperature from the HCC in "Responses to Additional Information Request" dated March 11, 2011.

**82. *Comment from Washington Department of Ecology***

Condition adaptive management measures up to and including a requirement to implement the temperature control structure alternative should modeling and data analysis demonstrate that Washington's temperature water quality standards are not be met.

**ODEQ Response:**

When IPC implements the temperature water quality certification conditions, ODEQ has reasonable assurance that the Hells Canyon Complex will not cause or contribute to violations of applicable water quality standards, see Oregon Administrative Rules, chapter 340, division 41. IPC evaluated the impacts of release from due to the Brownlee Operational Component in Exhibits 7.1-2 and 7.1-3 of the June 2018 application for water quality certification. IPC also evaluated the "point of maximum impact" on temperature from the HCC in "Responses to Additional Information Request" dated March 11, 2011.

**83. *Comments from US Fish and Wildlife Service***

Drafting of Brownlee Reservoir is a new addition to the draft certifications, and will be implemented to address temperature compliance with existing CWA site-specific criteria during late summer and fall periods. Drafting reduces residence times of cooler inflowing fall water by drafting warmer epilimnetic water earlier in the year to provide the cooler water when needed downstream: The Temperature Management Plan monitoring during Brownlee Reservoir drafting needs to be thorough. As drafting to as low as 1990 feet (mean sea level) from 2077 feet may be needed in some years, monitoring of temperature, DO, contaminants and potential methylmercury transport downstream into bull trout critical habitat during these operations is recommended.

As described in the draft certifications, if monitoring temperatures exceed 16.5 degrees C, as measured below Hells Canyon Dam in three consecutive years despite corrective measures, then a temperature alternative measures plan will be needed. This, in part, is referred to as "Plan B" and currently is described as a deep-water hypolimnetic pump. While there are engineered drawings provided in the CWA application, no operational descriptions, monitoring plans, or analysis of effects to ESA-listed species are included. As Plan B is part of the draft certifications, it could be considered part of the action for purposes of ESA compliance and consultation under section 7.

However, since implementation of Plan B may or may not occur at some point in the future, engineering designs are likely to change, and the analysis of effects of its implementation to water quality and biota have not been completed, the Service will not consider Plan B part of the action at this time.

**ODEQ Response:**

ODEQ acknowledges the comment.

## **10.7 Migration Corridor - Natural Seasonal Thermal Pattern and Cold water Refugia**

**84. *Comment from Columbia River Intertribal Fish Commission***

Understanding the natural seasonal thermal pattern ("NSTP") is not only ecologically important but is necessary for the long-term success of fall Chinook below the Hells Canyon Dam. The Project affects the thermal regime in the lower Snake River such that the river is unable to cool itself adequately during the early to mid-fall. The BOC should be used to provide temperature relief to meet the true NSTP standard and cool the pre-spawning habitat during late September to October since providing cooler habitat to fish that are holding has been shown to support successful spawning. Currently, ODEQ's approach to the NSTP standard does not reasonably assure compliance. Through reasoning not based on the evidence, ODEQ asserts that the SRSP will result in fall cooling. We do not agree. We also do not agree that there is enough viable coldwater refugia to protect fish when temperatures are hot.

**ODEQ Response:**

As noted in the temperature section of this Evaluation and Finding report, ODEQ finds that the project effect on the natural seasonal thermal pattern is sufficiently mitigated by implementation of the SRSP. For example, as seen in Figure 20 in this Evaluation and Findings Report, decreased inflow temperatures are expected to result in a decrease in the peak outflow temperatures. Oregon Administrative Rules (OAR) 340-041-0002(10) define cold water refugia as: those portions of a water body where or times during the diel temperature cycle when the water temperature is at least 2 degrees Celsius colder than the daily maximum temperature of the adjacent well-mixed flow of the water body. In Exhibit 6.1-1 of the June 2018 application for water quality

certification, IPC provided temperature data on numerous tributaries to the Snake River. These data indicate that several of the tributaries provide cold water that meets the cold-water refugia criteria of having a water temperature at least 2°C colder than the Snake River.

**85. *Comment from Columbia River Intertribal Fish Commission***

Several issues arise from the revised Oregon water temperature criteria: 1. A numeric criterion of 20°C for mainstem migration, followed by a 13°C criterion for spawning naturally implies that there will be a transition from peak summer water temperatures to initial optimum fall spawning temperatures. The NSTP should be interpreted to assure that temperatures decline during September, leading to the start of fall Chinook spawning. High temperatures created by the reservoir's thermal shift should not result in adult holding in high temperatures. 2. IPC has asserted that there are sufficient numbers of cold-water refugia that are sufficiently distributed to protect adult holding. The availability and use of cold water refugia must be demonstrated by agreed to field methods and observations to be acceptable. The use of rainbow trout as indicators of thermal refugia for fall Chinook salmon is not appropriate.

**ODEQ Response:**

As noted in the temperature section of this Evaluation and Finding report, ODEQ finds that the project induced changes in the natural seasonal thermal pattern is sufficiently mitigated by implementation of the SRSP. For example, as seen in Figure 20 in the Evaluation and Findings Report, decreased inflow temperatures are expected to result in a decrease in the peak outflow temperatures.

Oregon Administrative Rules (OAR 340-041-0002(10) define cold water refugia as: those portions of a water body where or times during the diel temperature cycle when the water temperature is at least 2 degrees Celsius colder than the daily maximum temperature of the adjacent well-mixed flow of the water body. In Exhibit 6.1-1 of the June 2018 application for water quality certification, IPC provided temperature data on numerous tributaries to the Snake River. These data indicate that several of the tributaries provide cold water that meets the cold-water refugia criteria of at least 2°C colder than the Snake River.

**86. *Comment from Nez Perce Tribe***

In addition to the above requests, the Tribe asks that ODEQ and IDEQ require IPC to verify, through peer-reviewed studies, the water bodies they identify as meeting the thermal refugia criteria, as explained in the comments provided by the Columbia River Intertribal Fish Commission (which the Tribe incorporates here by reference).

**ODEQ Response:**

Oregon Administrative Rules (OAR 340-041-0002(10) define cold water refugia as: those portions of a water body where or times during the diel temperature cycle when the water temperature is at least 2 degrees Celsius colder than the daily maximum temperature of the adjacent well-mixed flow of the water body. In Exhibit 6.1-1 of the June 2018 application for water quality certification, IPC provided temperature data on numerous tributaries to the Snake River. These data indicate that several of the tributaries provide cold water that meets the cold-water refugia criteria of at least 2°C colder than the Snake River.

## 10.8 Plan B

### 87. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited*

#### 1) Implement “Plan B” Now

In today’s climate, cold water is a valuable commodity, and it will only become more valuable in the future. In order to prevent thermal-related fish kills like what occurred to the 2015 Sockeye run, and pre-spawning impacts associated with long-term exposure to sub-lethal temperatures, measures that allow access to cold water in the hypolimnion of Brownlee Reservoir must be implemented now. In order to provide the reasonable assurance that the applicable temperature standards will be met, we recommend that the DEQs require IPC to implement Plan B, with the below additional conditions:

- 
- IPC will investigate, install and operate a hypolimnetic pumping system (HPS) to withdraw cold water from the hypolimnion of Brownlee reservoir to comply with the applicable temperature standards. b) IPC will install and operate the pump within five years of obtaining its FERC license. c) IPC will ensure that water discharged from the hypolimnion is treated such that: • Methyl-mercury concentrations will be lower than what is currently being discharged; • Dissolved oxygen concentrations meet the standard; • TDG concentrations do not exceed the standard • Nutrients, toxics and sediment concentrations do not degrade water quality downstream. IPC has done significant analysis of the feasibility of installing an HPS and we believe with some additional analysis regarding treatment options to ensure water quality discharged from Brownlee doesn’t degrade conditions downstream, an HPS can be installed and operated safely within five years of issuance of a new license.

#### **ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

### 88. *Comment from Nez Perce Tribe*

In our 2017 comments, the Tribe recommended an alternative management plan be developed to address water temperatures deemed deleterious to fall Chinook spawning and egg viability. The Tribe is pleased that IPC considered this recommendation and included the three consecutive years above 16.5 as a potential trigger for Plan B. Given that the Brownlee fall drawdown operation will, in theory, reduce the frequency of 16.5 degree water occurring after October 23, exceeding the 16.5 threshold would be an



indication of a severally degrading environment. As such, we recommend a slightly more aggressive Plan B trigger be established. If water temperatures below the Hells Canyon Dam exceed 16.5 degrees in three consecutive years or any three years within a five-year timespan, then ODEQ and IDEQ must require IPC to immediately implement Plan B found in the Alternatives Management Plan.

**ODEQ Response:**

Under Oregon Administrative Rules (OAR) 340-041-0028(12)(e) DEQ may require nonpoint sources including private hydropower facilities regulated by a 401 water quality certification to develop and implement a temperature management plan to achieve compliance with applicable temperature criteria or a load allocation in a TMDL. The water quality certification requires IPC to develop and implement a Temperature Management and Compliance Plan (TMCP). The TMCP contains the components required by OAR 340-041-0028(12)(e) including a description of measures IPC intends to use to reduce its temperature effect, a monitoring plan, and a compliance schedule for undertaking each measure. Additionally, the water quality certification may require adaptive management if IPC cannot implement the Snake River Stewardship Program, to ensure that all practical steps have been taken to address the temperature effect of the source on the water body.

Following the second five-year SRSP report, ODEQ may determine that temperature alternative measures are required. If ODEQ requires Plan B as the temperature alternative measure, IPC must evaluate whether the measure may cause or contribute to a violation of water quality standards and must provide a detailed description of actions needed to address the violation of water quality standards.

IPC proposed implementation of the Snake River Stewardship program to comply with the salmon spawning criterion of 13°C. ODEQ's authorization to allow insignificant additions of heat in waters that exceed the applicable temperature criteria is described in OAR 340-041-0028(12)(b). Recent monitoring data, like those recorded in 2014 and 2015, demonstrated brief periods in a few years at the onset of the spawning period where temperatures exceeded 17°C. IPC proposed implementation of the Brownlee operational component that, in conjunction with the SRSP, is expected to prevent water temperatures below the HCD in excess of 16.5°C. However, 16.5°C only triggers implementation of the Brownlee Operational Component, it is not a new criteria or a new proposed temperature regime for the Snake River below Hells Canyon Complex.

The water quality certification requires IPC to implement alternative measures if the water temperature in the Snake River below Hells Canyon dam during salmonid spawning period exceeds 16.5°C in three consecutive years. This trigger ties to the salmonid life cycle; therefore, at this time and based on the available information, ODEQ finds the trigger and such adaptive management is sufficient to protect water quality.

**89. *Comment from Nez Perce Tribe***

The Tribe therefore asks that ODEQ and IDEQ require IPC to develop the Alternative Management Plan for addressing water temperatures deleterious to spawning fall Chinook and egg viability prior to relicensing. This would ensure Plan B is ready for implementation at the beginning of the new license term. This includes installing and having ready for operation a hypolimnetic pump system ("HPS") to provide cold water relief to fish downstream of the HCC no later than three years into the new license term. Having an HPS in place early in the license term to withdraw cold water from the hypolimnion in Brownlee and Hells Canyon reservoirs is an important safeguard for fall Chinook below Hells Canyon Dam. Requiring the installation of the HPS also provides an accountable timeline by which IPC must

implement its MeHg management plan to eliminate the downstream transport of MeHg, which the HPS may exacerbate.

**ODEQ Response:**

ODEQ acknowledges your comment. ODEQ evaluated IPC's proposed activities for the new license term for compliance with applicable water quality standards, not the existing operation's compliance with standards.

**90. *Comment from National Marine Fisheries Service***

Similarly, the " Plan B" [the potential construction and operation of a temperature control structure within Brownlee Reservoir] identified in Idaho Power Company's 401 application (Section 7.1.2.5.3.1) has the potential to be more harmful than beneficial to salmon and steelhead because it has the potential to alter the physical, biological, and chemical processes within the reservoir and it will most likely export more anoxic, mercury and nutrient laden water downstream into the Hells Canyon reach of the Snake River. NMFS acknowledges that this is not the preferred option in the Section 401 Certifications, and would only be used in the event that the other, preferred measures, failed to achieve the desired benefits. However, it is appropriate for NMFS to reiterate its opposition to this measure until such time that Idaho Power Company (and the Oregon and Idaho DEQs) can clearly demonstrate that significant downstream impacts are not likely to occur as a result of this action. This should include a demonstration that the temperature control structure's alteration of the physical, biological, and chemical processes within Brownlee Reservoir will not negatively affect designated critical habitat downstream of the dam. This could include a demonstration that (1) water quality conditions within Brownlee reservoir would likely improve to the point that the export of this water would no longer be likely to have substantial, negative impacts to downstream areas, or (2) a means of improving the water quality passing through the structure had been developed so that water released from the structure would no longer be likely to produce substantial, negative effects to downstream areas.

**ODEQ Response:**

As noted in Section II.F.3.a.ii of the water quality certification, the Temperature Alternative Measures Plan must include an evaluation of whether the measure may cause or contribute to a violation of water quality standards. Any TAMP must include a detailed description of actions needed to prevent a violation of water quality standards.

**91. *Comment from Shoshone Bannock Tribes***

The Tribes are also concerned with the certainty of implementation of temperature control structures, tentatively proposed at Brownlee and Hells Canyon Reservoirs. During the first phase the project will be developed by IPC to provide cold water below Hells Canyon dam. A subsequent evaluation of Oxbow and Brownlee may occur if the risk of toxic transport is acceptable to each party and if the intended cold water benefits accrue. Without some level of certainty in the certification it is just as likely the proposed modifications do not occur and an off-site program allows for additional pollution trading at some point in the future.

**ODEQ Response:**

As noted in Section II.F.3.a.ii of the water quality certification, the Temperature Alternative Measures Plan must include an evaluation of whether the measure may cause or contribute to a violation of water quality standards. Any TAMP must include a detailed description of actions needed to prevent a violation of water quality standards.

## 10.9 Dissolved Oxygen

### 92. *Comment from Burns Paiute Tribe*

The proposed certification will allow inappropriate levels of dissolved oxygen throughout the Hells Canyon complex. The Burns Paiute Tribe joins other intervenors who raise this issue. Specifically, the Tribe joins the comments of the Shoshone-Bannock Tribe on this issue and incorporates those comments by reference with this letter.

#### **ODEQ Response:**

The Snake River TMDL addressed dissolved oxygen levels in Brownlee Reservoir. The TMDL assigned IPC a load allocation for the addition of 1,125 tons of dissolved oxygen per season to offset the reduction in assimilative capacity caused by the Project's impoundments. The Snake River TMDL notes, "This load allocation does not require direct oxygenation of the metalimnetic and transition zone waters. It can be accomplished through equivalent reductions in total phosphorus or organic matter upstream, or other appropriate mechanism that can be shown to result in the required improvement of dissolved oxygen in the metalimnion and transition zones to the extent required" (Page 450). IPC chose phosphorus reduction by implementing the Riverside Operational Water Quality Improvement Project.

To address low dissolved oxygen in the Snake River below the Hells Canyon dam, IPC is required to aerate to add 1.2 mg/L during the cool water aquatic life period and 1.5 mg/L during the salmonid spawning period. IPC notes, "While there may be times when slight increases or decreases are seen when comparing Brownlee and Hells Canyon outflow DO, on an overall average basis the combined effect of Oxbow and Hells Canyon Reservoirs on outflow DO from Hells Canyon is slightly positive (Figure 6.2-13)" (IPC June 2018 application for water quality certification, Page 87). As seen in Figure 6.2-13 of IPC's application, the increase in dissolved oxygen due to aeration at Brownlee is expected to carry through Oxbow and Hells Canyon reservoirs and to the outflow of Hells Canyon dam.

IPC is also required to implement an outflow dissolved oxygen alternative measures plan if the aeration systems are not achieving the required mg/L addition or dissolved oxygen levels fall below the minimum dissolved oxygen criteria. To address this comment and other similar comments, ODEQ edited section IV.D of the water quality certification to address state minimum dissolved oxygen requirements.

### 93. *Comment from Nez Perce Tribe*

Modify the DO required actions described in Section IV.A.3 to achieve a minimum DO threshold consistent with the 6.5 mg/l cool water aquatic life DO criteria as described in Oregon's Draft Evaluation and Findings Report. Just requiring an increase of 1.2mg/l- will likely result in water quality that remains unsuitable for adult salmonids. In addition, ODEQ should modify how IPC calculates the DO conditions. As proposed (30 consecutive-day floating average) metrics will not detect/eliminate instantaneous conditions that are lethal for adult salmon. Why improve conditions if lethal periods are still allowed? Add "at least one within six miles of HCD and another within 10 miles (i.e. one upstream and one downstream of Wild Sheep Rapids" to ensure DO is monitored before any significant natural oxygenation in section IV.B.3.

#### **ODEQ Response:**

ODEQ edited Section IV.D of the water quality certification to address this comment. IPC is required to implement an outflow dissolved oxygen alternative measures plan if the aeration systems are not achieving the required mg/L addition or dissolved oxygen levels fall below the minimum dissolved oxygen criteria. The minimum dissolved oxygen levels will be measured

within three miles downstream of Hells Canyon Dam. Available data indicates that several large rapids increase aeration by 1 to 2 mg/L 10 miles downstream (June 2018 application, Figure 6.2-18). Monitoring within 3 miles downstream of Hells Canyon Dam will ensure dissolved oxygen will be monitored before any significant natural oxygenation.

**94. *Comment from National Marine Fisheries Service***

NMFS supports the actions proposed in the draft 401 certifications to improve dissolved oxygen levels both within and downstream of Brownlee Dam. The aeration systems for 4 of the 5 units in the Brownlee Powerhouse should immediately improve downstream dissolved oxygen levels following construction. NMFS appreciates Idaho Power Company's efforts to implement this measure - with the scheduled completion of installation at each of the 4 units by the end of 2019 (Application, Section 7.2.2.3). The proposed measures to reduce phosphorus, sediment, and aquatic vegetation should, over a longer span of time, substantially reduce nutrient loads and increase dissolved oxygen levels in many reaches of the mainstem Snake River as well as in several tributaries upstream of Brownlee reservoir.

**ODEQ Response:**

ODEQ acknowledges the comment.

**95. *Comment from Shoshone Bannock Tribes***

The proposed certification would allow total phosphorous inflow levels to remain at 70 mg/L which is well above reasonable thresholds considering that algal blooms are already occurring seasonally throughout the HCC. The Tribes request that measures requiring a reduction of total phosphorous within the project be included as a component of the certification. Based on our review of outside standards, a reasonable target for the HCC would be 30 mg/L within the project (inflow and seasonally). Although the certification calls for measures to reduce algal blooms, it is difficult to understand how these will be accomplished if the primary driver of those blooms is not also addressed in this certification process.

**ODEQ Response:**

Site-specific chlorophyll a and total phosphorus targets (less than 14 ug/L and less than or equal to 0.07 mg/L respectively, applying from May through September) were identified by the 2003 Snake River TMDL, approved by EPA in 2004. The total phosphorus target is 0.07 mg/L, which is equivalent to 70 ug/l, not 70 mg/L as noted in the comment. Attainment of these targets is projected to result in a reduction of roughly 50 percent in algal biomass (as measured by chlorophyll a) that in turn will result in improvement in dissolved oxygen concentrations in both the Upstream Snake River and Brownlee Reservoir segments. The TMDL assigned IPC a load allocation for the addition of 1,125 tons of dissolved oxygen per season to offset the reduction in assimilative capacity caused by the Project's impoundments. The Snake River TMDL notes, "This load allocation does not require direct oxygenation of the metalimnetic and transition zone waters. It can be accomplished through equivalent reductions in total phosphorus or organic matter upstream, or other appropriate mechanism that can be shown to result in the required improvement of dissolved oxygen in the metalimnion and transition zones to the extent required" (Page 450). Also noted in the Snake River TMDL "In systems dominated by cyanobacteria (blue-green algae), such as the Brownlee Reservoir segment (RM 335 to 285) at some times of the year, phosphorus is usually the limiting agent" (Page 149). Reduction of phosphorus loads to Brownlee Reservoir, following implementation of the nutrient load and waste load allocations defined in the Snake River TMDL will reduce the production of algae, and likely should reduce the production of cyanobacteria.

**96. *Comment from Shoshone Bannock Tribes***

Current dissolved oxygen levels associated with the HCC do not meet water quality standards and should be addressed. Consideration of dissolved oxygen is directly related to proposals for cold-water augmentation structures because the source of cold water within the HCC comes primarily from a stratified level of the pools with near-zero concentrations of dissolved oxygen. Aeration structures can be installed within the HCC, particularly at Brownlee Dam, for reasonable costs to reduce overall downstream impacts from the upper pool's stratification. Aeration is also feasible at Hells Canyon and Oxbow Dams given the appropriate requirements to install those features in the certification.

**ODEQ Response:**

The Snake River TMDL addressed dissolved oxygen levels in Brownlee Reservoir. The TMDL assigned IPC a load allocation for the addition of 1,125 tons of dissolved oxygen per season to offset the reduction in assimilative capacity caused by the Project's impoundments. The Snake River TMDL notes, "This load allocation does not require direct oxygenation of the metalimnetic and transition zone waters. It can be accomplished through equivalent reductions in total phosphorus or organic matter upstream, or other appropriate mechanism that can be shown to result in the required improvement of dissolved oxygen in the metalimnion and transition zones to the extent required" (Page 450). IPC proposed to reduce phosphorus by implementing the Riverside Operational Water Quality Improvement Project. ODEQ finds this method is sufficient to meet its TMDL allocation.

ODEQ edited Section IV.D of the water quality certification to address this comment. To address low dissolved oxygen in the Snake River below the Hells Canyon dam, IPC is required to aerate to add 1.2 mg/L during the cool water aquatic life period and 1.5 mg/L during the salmonid spawning period. IPC notes, "While there may be times when slight increases or decreases are seen when comparing Brownlee and Hells Canyon outflow DO, on an overall average basis the combined effect of Oxbow and Hells Canyon Reservoirs on outflow DO from Hells Canyon is slightly positive (Figure 6.2-13)" (IPC June 2018 application for water quality certification, Page 87). As seen in Figure 6.2-13 of IPC's application, the increase in dissolved oxygen due to aeration at Brownlee is expected to carry through Oxbow and Hells Canyon reservoirs and to the outflow of Hells Canyon dam. IPC is required to implement an outflow dissolved oxygen alternative measures plan if the aeration systems are not achieving the required mg/L addition or dissolved oxygen levels fall below the minimum dissolved oxygen criteria.

**97. *Comment from Shoshone-Paiute Tribes***

The Tribes do not see how the proposal meets the requirements of the DEQ's while the total phosphorous inflow levels are to be maintained at 70 mg/L which is well above reasonable thresholds considering that algal blooms are already occurring seasonally throughout the HCC. The Tribes feel it would be beneficial if measures were implemented requiring a reduction of total phosphorous to 30 mg/L within the project as a component of the certification. The proposal suggests the need to reduce algal blooms. However, it is difficult to imagine how these goals will be met without the issue being addressed in this certification process.

Dissolved oxygen levels within the HCC are well below water quality standards and should be considered detrimental to ESA listed species within the project area. The coldwater within the HCC primarily comes from stratified un-oxygenated water. The Tribes believe Aeration structures should be installed within the HCC, particularly at Brownlee Dam, though Oxbow and Hells Canyon Dam could be reasonable location as well.

**ODEQ Response:**

Site-specific chlorophyll a and total phosphorus targets (less than 14 ug/L and less than or equal to 0.07 mg/L respectively, applying from May through September) were identified by the 2003

Snake River TMDL, approved by EPA in 2004. The total phosphorus target is 0.07 mg/L, which is equivalent to 70 µg/l, not 70 mg/L as noted in the comment. Attainment of these targets is projected to result in a reduction of roughly 50 percent in algal biomass (as measured by chlorophyll a) that in turn will result in improvement in dissolved oxygen concentrations in both the Upstream Snake River and Brownlee Reservoir segments. The TMDL assigned IPC a load allocation for the addition of 1,125 tons of dissolved oxygen per season to offset the reduction in assimilative capacity caused by the Project's impoundments. IPC chose phosphorus reduction by implementing the Riverside Operational Water Quality Improvement Project.

IPC notes, "During the cool-water life period there are statistically significant increasing trends in the 30-day mean minimum HCC outflow DO conditions (Figure 6.2-15, Table 6.2-8)" (IPC June 2018 application for water quality certification, Page 91). Under the water quality certification, IPC is required to aerate to add 1.2 mg/L during the cool water aquatic life period and 1.5 mg/L during the salmonid spawning period. ODEQ edited Section IV.D of the water quality certification to address this comment. IPC is required to implement an outflow dissolved oxygen alternative measures plan if the aeration systems are not achieving the required mg/L addition or dissolved oxygen levels fall below the minimum dissolved oxygen criteria.

**98. *Comment from US Fish and Wildlife Service***

Consumption of oxygen resulting in measured low DO levels is a problem at the HCC. Data indicate that low DO results partly from excessive nutrient loads entering Brownlee Reservoir. As described in the draft certifications, the IPC has been assigned a DO load allocation and will address that allocation through phosphorus reduction measures above the Project and oxygen supplementation measures at the HCC. The responsibility for the remaining nutrient load is allocated across other parties under a TMDL. In light of the proposed mitigation measures and because of the large nutrient load entering the Reservoir, it is unlikely that early-license DO level requirements will be adequate for ESA-listed bull trout and/or its critical habitat designated in Oxbow, the bypass, and Hells Canyon Reservoirs at certain times of the year. We would expect bull trout returns to both reservoirs after mid- October, especially as the BTPP is implemented going forward. Implementation of DO enhancement measures should increase DO over existing conditions in Oxbow and Hells Canyon reservoirs, and effective monitoring will be necessary to determine if DO levels are adequate for bull trout needs at those times of year. The Service will consider phosphorus reduction, oxygen supplementation, Alternative Measures Plans and DO Monitoring Plans in our ESA section 7 BO analyses.

**ODEQ Response:**

ODEQ acknowledges the comment.

**99. *Comment from Idaho Conservation League***

We question whether the 401 Certifications include sufficient provisions necessary to ensure Idaho's and Oregon's water quality standards will be met. The SR-HC TMDL requires an inflow concentration of 70 µg/l or less of TP during the critical period of May through September in order to prevent excessive algal growth and comply with a seasonal average of 14 µg/l of chlorophyll a (chl-a). However, based on data showing the relationship between chl-a and TP (Havens and Nerunberg, 2004)<sup>1</sup>, we are concerned that this short-term water quality target will not meet water quality standards due to insufficient reduction of TP within the HCC.

Recently approved state water quality standards for lakes and reservoirs identify 15 to 40 µg/l TP concentrations for various types of lakes (e.g. stratified & unstratified lakes, reservoir and drainages) as necessary to minimize the risk of chl-a blooms (5% and 1% chance of 20 µg/l and 30 µg/l chl-a bloom respectively). As an example, the Wisconsin standard for deep stratified reservoirs, analogous to the

Brownlee Reservoir, is 30 µg/l TP2. Thus, the proposed requirement of 70 µg/l or less for incoming flow will likely not prevent the formation of chl-a and harmful algal blooms (HAB).

We recommend that both the Idaho and Oregon 401 Certifications for operation of the HCC include provisions that will ensure water quality standards for both states are met. Our recommended provisions include:

- Seasonal (May-September) TP concentration targets of 30 µg/l or less for the Brownlee, Oxbow, and Hells Canyon reservoirs
- A requirement to reduce TP concentrations by 40 µg/l between May-September in order to meet the 30 µg/l target within reservoirs (e.g. 70 µg/l SR-HC inflow – 30 µg/l Stratified reservoir target).

Based on research and standards from other states presented herein, inclusion of these recommendations seems necessary in order to achieve compliance with all state water quality standards. If either DEQ elects not to include more stringent reduction standards, we request notification of their selected standards as well as justification regarding how the chosen standards will comply with all applicable water quality standards.

**ODEQ Response:**

As noted in the comment site-specific chlorophyll a and total phosphorus targets (less than 14 µg/L and less than or equal to 0.07 mg/L respectively) were identified by the 2003 Snake River TMDL, approved by EPA in 2004. To change the phosphorus target in the Snake River, DEQ would have to revise the TMDL, re-evaluate the allocations and load allocations described in the TMDL and seek EPA approval. ODEQ creates a list of TMDLs to be developed. ODEQ submits the list to EPA as part of the Integrated Report and the Performance Partnership Grant. ODEQ may update the IR report about every two years and updates the PPG every two years. The PPG describes the work ODEQ will perform with Section 106 grants from EPA. ODEQ develops the TMDL development list considering TMDL litigation, Coastal Zone Act Reauthorization Amendments gaps, and the water quality permit issuance plan. Updates to the Snake River TMDL are not on the list.

**100. Comment from Upper Snake River Tribes Foundation**

USRT questions whether the Certification includes sufficient provisions necessary to ensure Idaho's and Oregon's WQS will be met. The TMDL requires an inflow concentration of 70 µg/l or less of total phosphorus (TP) during the critical period of May through September in order to prevent excessive algal growth and comply with a seasonal average of 14 µg/l of chlorophyll a (chl-a); however, based on data showing the relationship between chl-a and TP (Havens and Nerunberg, 2004)<sup>6</sup>, we are concerned that this short-term water quality target will not meet WQS due to insufficient reduction of TP within the HCC.

Recently approved state WQS for lakes and reservoirs identify 15 to 40 µg/l TP concentrations for various types of lakes (e.g. stratified & unstratified lakes, reservoir and drainages) as necessary to minimize the risk of chl-a blooms (5% and 1% chance of 20 µg/l and 30 µg/l chl-a bloom, respectively). As an example, the Wisconsin standard for deep stratified reservoirs, analogous to the Brownlee Reservoir, is 30 µg/l TP7. Thus, the proposed requirement of 70 µg/l or less for incoming flow will likely not prevent the formation of chl-a and harmful algal blooms (HAB).

USRT submits the following comments, supported by Idaho Conservation League:

- Seasonal (May-September) TP concentration targets of 30 µg/l or less for the Brownlee, Oxbow, and Hells Canyon reservoirs

- A requirement to reduce TP concentrations by 40 ug/l between May-September in order to meet the 30 µg/l target within reservoirs (e.g. 70 µg/l SR-HC inflow – 30 µg/l Stratified reservoir target).

**ODEQ Response:**

As noted in the comment site-specific chlorophyll a and total phosphorus targets (less than 14 ug/L and less than or equal to 0.07 mg/L respectively) were identified by the 2003 Snake River TMDL, approved by EPA in 2004. To change the phosphorus target in the Snake River, DEQ would have to revise the TMDL, re-evaluate the allocations and load allocations described in the TMDL and seek EPA approval. ODEQ creates a list of TMDLs to be developed. ODEQ submits the list to EPA as part of the Integrated Report and the Performance Partnership Grant. ODEQ may update the IR report about every two years and updates the PPG every two years. The PPG describes the work ODEQ will perform with Section 106 grants from EPA. ODEQ develops the TMDL development list considering TMDL litigation, Coastal Zone Act Reauthorization Amendments gaps, and the water quality permit issuance plan. Updates to the Snake River TMDL are not on the list.

## 10.10 Riverside Water-Quality Improvement Project

### 101. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited*

Dissolved oxygen concentrations within and below the HCC fall below state standards established for the protection of aquatic life. In general, we support the measures IPC has proposed to increase DO concentrations, including the Riverside Operational Water Quality Improvement Project, Grand View Sediment Reduction Program, and the Swan Falls Project Aquatic Vegetation and Debris Removal Program. We encourage IPC to develop and implement robust monitoring plans for these programs as described in ODEQ's draft 401 document.

**ODEQ Response:**

ODEQ acknowledges the comment.

### 102. *Comment from Confederated Tribes of Umatilla Indian Reservation*

While efforts to remedy low dissolved oxygen problems like the Riverside Operational Water Quality Improvement Project may be beneficial, its outcomes must be accurately monitored and evaluated. Reductions in total phosphorus loading should be sought, but care must be taken to determine how effective those efforts are, and how they could be refined or enhanced.

**ODEQ Response:**

Section III.B.1 of the water quality certification requires IPC to monitor the total phosphorus concentrations in tributary inflows and spill as well as flow at these locations. IPC will use these values to calculate the phosphorus load from the tributaries and load reduction from the ROWQIP. Exhibit 7.2-1 evaluates the phosphorus reduction using data collected in 2014. Exhibit 7.2.5 summarizes data collected in 2015, Exhibit 7.2-6 summarizes data collected in 2016, and Exhibit 7.2-7 summarizes data collected in 2017. The results indicate that the ROWQIP can attain the 15,000 pounds phosphorus reduction required by the water quality certification.

### 103. *Comment from Columbia River Intertribal Fish Commission*

We have concerns with monitoring and evaluating the Riverside Operational Water Quality Improvement Project (ROWQIP). The project is designed to mitigate low dissolved oxygen concentrations in Brownlee



Reservoir and the Snake River by reducing total phosphorus (TP) loads to the river. Monitoring the non-point sources of TP is fraught with challenge and there is no known baseline study from which to relate actual reductions of TP loads. Pre-project conditions should be established before the project goes into effect. We are concerned that the measures specified by the DEQs are inadequate to evaluate the success or failure of the ROWQIP.

**ODEQ Response:**

The baseline flow is the water right for water diverted from the Boise River. The baseline concentration is the concentration measured in water sources flowing into the Riverside Canal.

**104. *Comment from Columbia River Intertribal Fish Commission***

The assumption that surface runoff and sub-surface seepage loads from farm land is not conservative and requires verification. First, IPC is responsible for reducing the load of total phosphorus, which includes particulate phosphorus. Second, soils may have the capacity to retain a large percentage of phosphorus, as is argued in the application, but this does not address the long-term effects of increased soil concentrations over time. Thus, IPC considers the potential long-term accumulation of phosphorus on agriculture lands to be inconsequential to the results of the program. This is not a conservative assumption. IPC should be held responsible for testing the aforementioned assumption (it should have been tested and verified before submittal of the application). We realize that this will not be an easy task. Agricultural run-off is a non-point source discharge and will be difficult to evaluate. Another challenge in evaluating the model assumption will be teasing out site-specific fertilizer application. Without verification, however, there will be no way to demonstrate, with any certainty, the actual benefits of the program, if any exist.

**ODEQ Response:**

Table 7.2-2 in IPC's June 2018 application notes the annual average phosphorus load reduction from the ROWQIP. The water quality certification requires IPC to provide an annual report demonstrating the implementation of the ROWQIP, Grand View Program and Swan Falls Program attained the dissolved oxygen load allocation, expressed as a total phosphorus reduction.

**105. *Comment from Columbia River Intertribal Fish Commission***

IPC has not included a monitoring plan for the ROWQIP but will evidently submit a plan within the first year of the new license, per the draft 401 certification. The monitoring plan should include methods to validate the assumption that surface runoff and sub-surface seepage from farm land will remain unchanged. In addition, the draft monitoring plan should be open to public comment.

**ODEQ Response:**

Section III.B.1 of the water quality certification requires IPC to develop a monitoring plan to monitor implementation of the ROWQIP. The required components are specifically described in Section III.B.1. Pursuant to Oregon public records law, CRTFC may request a copy of the monitoring reports and submit comments to DEQ, as desired.

**106. *Comment from Nez Perce Tribe***

The actual impact of the ROWQIP on phosphorus loads entering the Brownlee Reservoir is hard to predict. The Tribe would thus like to see verification that IPC's assumptions regarding surface runoff and sub-surface seepage from farmland are indeed accurate. For this reason, the Tribe also supports the certification condition that IPC submit a monitoring plan for the ROWQIP within the first year of the new license. The Tribe expects that monitoring completed under this plan will help resolve the uncertainty regarding the efficacy of the ROWQIP at reducing nutrient delivery to the HCC system. The Tribe also

suggests that an adaptive management approach to the ROWQIP be captured in the certification conditions in case some of IPC's underlying assumptions regarding surface and subsurface nutrient delivery prove unfounded.

**ODEQ Response:**

Section III.B.1 of the water quality certification requires IPC to develop a monitoring plan to monitor implementation of the ROWQIP. The required components are specifically described in Section III.B.1. ODEQ and IDEQ shall consult on review and approval of the monitoring plan. IPC proposed additional measures to address the required phosphorus reduction: Grand View program and Swan Falls program. Section III.B.6.d requires Brownlee DO Alternative Measures (e.g., adaptive management) if ODEQ determines that implementation of the ROWQIP, Grand View program and Swan Falls program are not sufficient to attain the dissolved oxygen load allocation.

**107. *Comment from Riverside Irrigation District***

Riverside Irrigation District, Ltd (RID) supports the proposed 401 Certification of the HCC project and specifically the condition to implement the Riverside Operational Water Quality Improvement Plan (ROWQIP) to address concerns related to Brownlee Reservoir dissolved oxygen levels. Over the past five years, RID has worked with Idaho Power Company (IPC) in this cooperative effort to improve water quality in Boise and Snake Rivers. The proposed 401 Certification will ensure these efforts continue for many years.

**ODEQ Response:**

ODEQ acknowledges the comment.

## **10.11 Distributed Aeration**

**108. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited***

We also support the Distributed Aeration System project and encourage IPC to continue to upgrade the remaining identified turbines at Brownlee Powerhouse. We support IPC taking an adaptive management approach with the Distributed Aeration System. We also encourage the installation of this type of system at Oxbow and Hells Canyon dams. In addition, we support the installation of a destratification system in Oxbow Reservoir.

If the DO enhancement measures result in violations of the total dissolved gas (TDG) standard (110%), despite the installation of the flow deflectors, IPC should seek a waiver of the TDG standard during times of spill.

**ODEQ Response:**

ODEQ acknowledges the comment that appears to be addressed to IPC. For your reference, Oregon Administrative Rules (OAR) 340-041-0031(2) provides that "Except when stream flow exceeds the ten-year, seven-day average flood, the concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection may not exceed 110 percent of saturation." And while OAR 340-041-0104 (3) states that the Environmental Quality Commission "may modify the total dissolved gas criteria in the Columbia River to allow increased spill for salmonid migration," the allowance for modification to the total dissolved gas criteria is only available for the Columbia River and so is not applicable to the Hells Canyon Complex on the Snake River.

**109. *Comment from Columbia River Intertribal Fish Commission***

IPC is proposing to upgrade four of the five turbines at the Brownlee Powerhouse with distributed aeration systems. It is not clear from the information provided by IPC whether the TDG created by the distributed aeration system will be remediated by the proposed flow deflector installation at each of the dams.

**ODEQ Response:**

In the June 2018 application for water quality certification IPC notes, “Spilling at the HCC projects is almost exclusively involuntary, occurring usually as a result of flood-control constraints or high-runoff events (IDEQ and ODEQ 2004). Spilling typically occurs between December and July in higher water years when Snake River flows exceed the project’s flood-storage capacity, as mandated by the USACE, or the hydraulic capacity of generation turbines. Other unusual situations, including emergencies or unexpected unit outages, can induce a spill episode at any of the projects. Spilling water at any of the 3 projects within the HCC can increase TDG to supersaturation levels that exceed the 110% of saturation criterion” (Page 105). IPC proposes to the following to address TDG exceedances: 1) the continued preferential spilling of water through the Brownlee Dam upper spill gates as an early implementation measure, 2) the installation of HCD sluiceway flow deflectors, 3) the installation of Brownlee Dam spillway flow deflectors, and 4) the installation of a spillway flow deflector at Oxbow Dam. All of these measures involve changes at the spillway, not at the powerhouse, so it is unlikely the TDG measures will address elevated TDG from aeration at the turbines.

**110. *Comment from Columbia River Intertribal Fish Commission***

If, after any Annual Report, ODEQ determines that the distributed aeration systems are not achieving or will not likely achieve an increase in DO in the outflow of Hells Canyon Dam of at least an average of 1.4 mg/L during the applicable period, IPC will provide hourly turbine operations, DO and TDG levels to the DEQs for review. In addition, distributed aeration systems should be considered at the other projects within the complex (e.g. Oxbow and Hells Canyon Dam).

**ODEQ Response:**

This comment appears to be a suggestion for additional language in the water quality certification. ODEQ edited Section IV.D of the water quality certification to respond to this and similar comments. IPC will be required to implement outflow dissolved oxygen alternative measures (e.g., adaptive management) if the aeration systems are not achieving the required mg/L addition or dissolved oxygen levels fall below the minimum dissolved oxygen criteria. The minimum dissolved oxygen levels will be measured within three miles downstream of Hells Canyon Dam. If such occurrences arise, ODEQ may request IPC submit an alternative management measures plan that ODEQ will review and approve to provide reasonable assurance of compliance with the dissolved oxygen conditions.

**111. *Comment from Nez Perce Tribe***

The Tribe supports the requirement that IPC install distributed aeration systems at four of the five Brownlee powerhouse turbines, but the Tribe is concerned that the systems may produce elevated total dissolved gas ("TDG") levels in exceedance of current standards. If the aerations systems in the Brownlee powerhouse turbines perform well-measurably increase dissolved oxygen in the Hells Canyon Dam outflow without causing the exceedance of the 110% standard for dissolved gas-IPC should be required to install distributed aeration systems at the Oxbow and Hells Canyon Dams. The Tribe also supports EPA's recommendation that by year fifteen of the reissued license, IPC be required to ensure that the 30-day rolling average of the daily mean dissolve oxygen ("DO") concentration in the Hells Canyon Dam

outflow meet or exceed 6.5 mg/L. The Tribe also supports EPA's recommendation that the 7-day rolling average of the daily mean DO concentration in Hells Canyon Dam outflow meet or exceed 8.5 mg/L after October 23 of each year to support spawning.

**ODEQ Response:**

ODEQ notes that EPA did not provide comments on the draft water quality certification.

This comment appears to be a suggestion for additional language in the water quality certification. ODEQ edited Section IV.D of the water quality certification to address this comment. IPC will be required to implement outflow dissolved oxygen alternative measures (e.g., adaptive management) if the aeration systems are not achieving the required mg/L addition or dissolved oxygen levels fall below the minimum dissolved oxygen criteria. The minimum dissolved oxygen levels will be measured within three miles downstream of Hells Canyon Dam.

## 10.12 Destratification System in Oxbow Bypass

112. *Comment from Nez Perce Tribe*

The Tribe supports implementation of the destratification system for the Oxbow Reservoir.

**ODEQ Response:**

ODEQ acknowledges the comment.

## 10.13 Total Dissolved Gas

113. *Comment from Nez Perce Tribe*

The Tribe agrees that installing flow deflectors at the HCC dams will aid in reducing TDG levels under high flow conditions or when spill is occurring. As noted above, the Tribe is concerned that the aeration systems at the Brownlee Dam will cause an exceedance of TDG 110% standard. The Tribe therefore encourages monitoring and adaptive management, if necessary. The Tribe supports the Columbia River Inter-Tribal Fish Commission's suggestion that the results from TDG monitoring be placed on a publicly accessible Web site.

Give first priority to the Hells Canyon Sluiceway flow deflector design plans over other projects in Section VLB.1.

**ODEQ Response:**

Pursuant to Oregon public records law, data and reports provided to ODEQ by IPC are available upon request.

The water quality certification requires IPC to install and implement flow deflectors as described in Section 7.3.1.2 - .4 of the IPC Application. The water quality certification requires IPC to construct and install the Oxbow Dam spillway flow deflector within 2 years of the completion of FERC's required design review process and required permitting. IPC requested flexibility in the sequencing of construction, but the certification still requires construction of the flow deflectors within 6 years of completion of FERC's required design review process and any required permitting.

114. *Comment from National Marine Fisheries Service*

NMFS supports the actions proposed in the draft 401 certifications to reduce or minimize Total Dissolved Gas (TDG) levels resulting from spilling water at the three Hells Canyon Complex dams. The proposed

flow deflectors at each of the three dams (Application, section 7.3) are similar to those installed at other Snake and Columbia River hydroelectric projects, which have proven to be effective at reducing TDG levels at design flows.

**ODEQ Response:**

ODEQ acknowledges the comment.

## 10.14 Toxics

### 115. *Comment from Burns Paiute Tribe*

The proposed certification will allow transportation of toxics downstream from the Hells Canyon Complex. The Burns Paiute Tribe joins other intervenors who raise this issue. Specifically, the Tribe joins the comments of the Shoshone-Bannock Tribe on this issue and incorporates those comments by reference with this letter.

**ODEQ Response:**

As noted in IPC's June 2018 Application for water quality certification, within the Hells Canyon Complex, "Several researchers reported concentrations of inorganic trace elements other than mercury and organic compounds other than t-DDT and dieldrin. Generally, none of the trace elements or organic concentrations exceeded criteria (Clark and Maret 1998; Essig and Kosterman 2008; Harrison et al. 2012; Fosness et al. 2013)" (Page 138). Exhibit 6.6-1 summarizes data from Harrison et al (2012). As noted in Exhibit 6.6-1, IPC collected samples from the Brownlee Reservoir hypolimnion and Brownlee dam discharge. As noted in IPC Application Exhibit 6.6-1 "In addition to comparing organic and inorganic toxics concentrations with criteria, concentrations of the hypolimnetic waters within Brownlee Reservoir are compared with the concentrations of water discharging from the reservoir to assess potential changes in toxic concentrations that could occur if hypolimnetic waters are accessed" (Page 1). Inorganic parameters and organic parameters were analyzed, along with total and methyl mercury. ODEQ, IDEQ, U.S. Fish and Wildlife Service (FWS), and IPC selected the list of parameters. As noted in IPC Application Exhibit 6.6-2 "Of the 470 organic constituents analyzed in 2011, only 7 pesticides, including the isomers or degradates of pesticides, were detected in the water column. Other organic compounds, including semi-volatile organic compounds (SVOCs), individual polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and dioxins, were detected at levels less than the laboratory limits of quantification. All concentrations were less than the aquatic-life criteria and benchmarks established by the U.S. Environmental Protection Agency" (Page 3). Also noted in Exhibit 6.6-2 "However, fish consumption advisories based on mercury are in place for Brownlee Reservoir, and the relatively high methylmercury concentrations detected in the hypolimnion of Brownlee Reservoir (2.5–2.9 ng/L) were noted by Harrison and others (2012) as a human health concern" (Page 3). Based on data collected in these studies, mercury and methylmercury were selected for further analysis and studies are on-going to inform future measures.

### 116. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited*

In 2004, the Snake River - Hells Canyon Total Maximum Daily Load (TMDL) was completed. Identifying a need to gather more information, a mercury component was not included in the TMDL and deferred action to a separate mercury TMDL to be completed by 2006. Over 12 years has passed since the deadline for a mercury TMDL and further delay is unacceptable.

**ODEQ Response:**

ODEQ creates a list of TMDLs to be developed. ODEQ submits the list to EPA as part of the Integrated Report and the Performance Partnership Grant. ODEQ may update the IR report about every two years and updates the PPG every two years. The PPG describes the work ODEQ will perform with Section 106 grants from EPA. ODEQ develops the TMDL development list considering TMDL litigation, Coastal Zone Act Reauthorization Amendments gaps, and the water quality permit issuance plan. The Snake River mercury TMDL is not on the TMDL development list.

**117. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited***

The draft 401 Certifications require that IPC produce a methyl-mercury management plan upon completion of ongoing USGS studies. We believe that the ongoing study is useful and should continue; however, there appears to be enough information now for IPC to begin to develop the required management plan. Such a plan could be adaptive in nature, informed by the USGS study or additional studies that may be required. We suggest the following for inclusion to the management plan: The plan includes specific actions occur within specified timeframes that IPC will take to reduce methyl-mercury fish tissue concentrations. 2) Public review and input of the management plan shall be required before the DEQ's approve such a plan. 3) The plan should consider all potential measures to reduce conditions for methylation to occur, including but not limited to; reducing nutrient inflow into Brownlee reservoir, reservoir aeration, remediation of accumulated reservoir contaminants in the lower portion of the hypolimnion and/or sediments and reservoir drawdown.

**ODEQ Response:**

As described in this Evaluation and Findings Report, higher concentrations of methylmercury tended to occur in deeper waters in Brownlee Reservoir (see Figure 28). The methylmercury concentrations in Brownlee Reservoir sediments are elevated compared to regional or local sediment methylmercury data (Figure 30). These results indicate that the methylation processes in Brownlee Reservoir may be different from processes occurring in other reservoirs or natural lakes. USGS notes, "However, based on previous mercury research, there are characteristics within the HCC that are consistent with increased susceptibility to methylmercury accumulation" (USGS July 2016). IPC, in partnership with USGS, continues to study the Hells Canyon Complex system to understand the spatial and temporal distribution and transport of the different forms of mercury. Because of the need to assess the characteristics of the system and understand the processes controlling mercury cycling in the Hells Canyon Complex, ODEQ concluded it was reasonable to complete this study to inform adaptive management. ODEQ edited the water quality certification (Section VIII.A.4) to require IPC to complete the study and the predictive model no later than one year after issuance of the FERC license, or a later date only if approved by ODEQ and IDEQ. Pursuant to Oregon public records law, a copy of any management plan is available upon request.

**118. *Comment from Confederated Tribes of Umatilla Indian Reservation***

Mercury contamination of fish is a serious problem in the Columbia River Basin, including the Snake River and the Hells Canyon reach. Tribal members, as high fish consumers, are particularly vulnerable to its risks. The Certification needs to adopt a stronger approach to address this issue, including required development and implementation of a Mercury Management Plan. The problem exists now, and additional delay should be avoided; actions should not wait for the USGS study to be completed and further modeling to occur. An adaptive methylmercury management plan must be formulated that includes actions that can be initiated immediately.

**ODEQ Response:**

As described in the mercury section of this Evaluation and Findings Report higher concentrations of methylmercury tended to occur in deeper waters in Brownlee Reservoir (see Figure 28). The methylmercury concentrations in Brownlee Reservoir sediments are elevated compared to regional or local sediment methylmercury data (Figure 30). These results indicate that the methylation processes in Brownlee Reservoir may be different from processes occurring in other reservoirs or natural lakes. USGS notes, “However, based on previous mercury research, there are characteristics within the HCC that are consistent with increased susceptibility to methylmercury accumulation” (USGS July 2016). IPC, in partnership with USGS, continues to study the Hells Canyon system to understand the spatial and temporal distribution and transport of the different forms of mercury. Because of the need to assess the characteristics of the system and understand the processes controlling mercury cycling in the Hells Canyon Complex, ODEQ thinks it is premature to require IPC to implement measures at this time. ODEQ edited the water quality certification (Section VIII.A.4) to require IPC to complete the study and the predictive model no later than one year after issuance of the FERC license, or a later date only if approved by ODEQ and IDEQ. Once submitted to ODEQ, the management plan will be public information and available upon request.

**119. *Comment from Columbia River Intertribal Fish Commission***

The section on a mercury management plan is severely lacking in substance and consequently, DEQ cannot reasonably assure that the Project will comply with toxics criteria. Elevated levels of methylmercury in fish tissue and sediment is a primary concern of CRITFC tribes. The current 401 Certifications postpone management of the problem until the completion of the USGS study followed by the development of more models and scenarios. All of these promises fail to address the urgency of the situation. Levels of methylmercury in the tissue of smallmouth bass in each of the Project’s reservoirs exceeds Oregon’s human health criteria of 0.040 mg/kg and a significant number exceed Idaho’s criteria as well. Sturgeon downstream from the project are subject to consumption advisories for methylmercury. The DEQs need to require the development of an adaptive methylmercury management plan that initiates management actions immediately. The management plan could be informed by recent findings and recommendations of the Oregon’s Willamette Basin Mercury TMDL process. The DEQs must also ensure that all data and models that were or will be used for study and monitoring of the mercury issues are transparent and publicly available at all stages.

In addition, preliminary data from the USGS (Stakeholder Meeting, Boise, ID, February 8, 2017) indicates that Brownlee Reservoir is primarily responsible for the methylation in the HCC. Therefore, implementation of a mercury management plan by Idaho Power Company (IPC) at the Project as soon as possible will be essential in assuring compliance with mercury and methylmercury criteria in both OR and ID. The 401 Certifications require that IPC produce a methylmercury management plan to address the role that the Project has in violation of mercury human health criteria. The certifications require this plan only at the completion of the USGS study, which fails to address the urgency of the situation. The USGS has now documented its multi-year evaluations of methylmercury in the water column and sediment by season, depth, and concentration. This information should be used to inform adaptive management strategies that should be implemented before the end of the USGS study. CRITFC recommends that the Draft Clean Water Act § 401 Certification Conditions for the Hells Canyon Complex Hydroelectric Project be modified as follows:

### VIII. Mercury

A. Required Actions: IPC shall take the following actions, which are further detailed in the conditions set out below, to comply with the applicable criteria (OAR 340-041- 0007(10) and OAR 340-041-0033(1), (2) and (3); IDAPA 58.01.02.210.01):

1. IPC shall continue to assist in funding the U.S. Geological Survey (“USGS”) mercury and methylmercury study as described in Section 6.6.2.2.1 of the Application, which includes the development of a predictive model.

2. IPC shall update the DEQs and affected tribes annually on the progress of the mercury and methyl mercury studies with USGS.

3. If USGS fails to complete the study, then IPC shall complete the study and develop the predictive model.

Recommended Additions:

The DEQs both require that IPC continue to fund the USGS in the development of a predictive model and provide reports on the key processes that influence methylmercury production in order to develop an effective management plan. Providing a report alone is insufficient to allow full peer review. The predictive model that is developed by either the USGS or by and IPC contractor should follow the US Government’s Federal Source Code policy to improve availability and review. The model, including software, data/databases, data preparation software, dependencies, data/databases shall be made accessible to states and tribes and be accessible via a public repository. The predictive model shall be independently tested and peer reviewed. Review reports shall be made available to states and tribes. Technical staff from tribes and states should be able to independently reproduce the modeling results.

C. Methyl Mercury Management Scenarios. Within 180 days of completion of the report on key processes described in section VIII.B above, IPC shall run a series of management scenarios to evaluate how to minimize, to maximum extent practicable, the Project’s effect on methyl mercury production.

Require IPC to immediately begin developing a series of mercury management scenarios to evaluate how to minimize the Project’s effect on methylmercury production and limit violation of the human health criteria in Idaho and Oregon and incorporates strategies from Oregon’s Willamette Basin Mercury TMDL process.

D. Methyl Mercury Management Plan. Within 180 days following completion of the Hells Canyon Complex predictive model scenarios described in section VIII.C above, IPC shall propose to the DEQs a methyl mercury management plan to address the Hells Canyon Complex’s role in methyl mercury production. After consultation with IDEQ and once approved by ODEQ, IPC shall implement the methyl mercury management plan in accordance with ODEQ’s approval.

The 401 Certifications should require that IPC immediately develop a methylmercury management plan based on findings already gathered from the USGS multi-year evaluations of methylmercury in the water column and sediment by season, depth, and concentration. This information together with an adaptive management strategy could lead to implementation well before the end of the USGS study. IPC shall implement actions that are consistent with a Management Plan and evaluate the results of these actions. The Mercury/Methylmercury Management Plan shall be submitted for outside peer review and alternative assessments. Review reports shall be made available to states and tribes.



**ODEQ Response:**

As described in the mercury section of this Evaluation and Findings Report higher concentrations of methylmercury tended to occur in deeper waters in Brownlee Reservoir (see Figure 28). The methylmercury concentrations in Brownlee Reservoir sediments are elevated compared to regional or local sediment methylmercury data (Figure 30). These results indicate that the methylation processes in Brownlee Reservoir may be different from processes occurring in other reservoirs or natural lakes. USGS notes, "However, based on previous mercury research, there are characteristics within the HCC that are consistent with increased susceptibility to methylmercury accumulation" (USGS July 2016). IPC, in partnership with USGS, continues to study the Hells Canyon system to understand the spatial and temporal distribution and transport of the different forms of mercury. Because of the need to assess the characteristics of the system and understand the processes controlling mercury cycling in the Hells Canyon Complex, ODEQ thinks it is premature to require IPC to implement measures at this time. ODEQ edited the water quality certification (Section VIII.A.4) to require IPC to complete the study and the predictive model no later than one year after issuance of the FERC license, or a later date only if approved by ODEQ and IDEQ. Once submitted to ODEQ, the management plan will be public information and available upon request.

**120. Comment from Nez Perce Tribe**

Contamination of the Snake River riverine environment with toxic chemicals and pesticides is of paramount concern to the Tribe due to the health threat such contamination poses to Tribal members who fish at the Tribe's usual and accustomed places. In addition to salmon and steelhead, the Tribe has traditionally harvested other aquatic species, including trout (bull trout, cutthroat trout, and rainbow trout), several species of suckers, white fish, Northern pikeminnow, some shellfish (freshwater clams), lamprey, and white sturgeon. Many of these species are susceptible to the uptake of toxic chemicals and pesticides. Consequently, the high concentrations of methylmercury ("MeHg") found downstream of the HCC is extremely concerning to the Tribe. There is no larger threat to the health of Tribal members who catch and consume these fish and to the Tribe's Treaty-reserved fishing right than the high levels of MeHg found in Snake River fish species downstream of the HCC. For this reason, Oregon, Idaho, and IPC urgently need to address MeHg production and transport caused or contributed to by the HCC as soon as possible, early within the next license term.

Although the Tribe believes that its white sturgeon consumption moratorium and fish consumption advisories are a necessary interim reaction to MeHg contamination in the Snake River below the HCC, the measures are not a solution to the MeHg contamination caused, or greatly contributed to, by the continued operation and maintenance of the HCC. The Tribe's Treaty rights will continue to be violated and Tribal members will continue to be harmed until MeHg contamination from the HCC is stopped.

Given the urgent need to address MeHg production and transport caused or contributed by the HCC, the Tribe expects ODEQ and IDEQ to require aggressive, meaningful, and timely prescriptions to resolve this problem. While the Tribe supports IPC's study with USGS to address this problem, significant improvements to the Draft 401 Certification conditions are necessary. Needed improvements include accelerating the development of a MeHg management plan as well implementing an approach in the short-term which leads to immediate reductions in MeHg. This will not only enable IPC to begin addressing MeHg contamination downstream of the Hells Canyon Dam sooner, but it will enable IPC to respond to future elevated water temperatures without exacerbating MeHg contamination downstream of the HCC (see "Temperature" section below).

Despite the ODEQ's and IDEQ's acknowledgement of the MeHg problem in the Hells Canyon- Snake River reach, thirteen years have passed since 2006 when ODEQ and IDEQ committed to having TMDL completed for mercury. Curiously, Oregon's Evaluation and Findings Report expressly acknowledges the agencies' commitment, but fails to mention that EPA approved the HC-SR TMDL without mercury provided that ODEQ and IDEQ complete the mercury TMDL by 2006.

In 2014, IPC and USGS, in collaboration with IDEQ, started an investigation to evaluate processes controlling mercury transport, cycling, and bioaccumulation. While these studies may provide information useful for the development of a mercury or MeHg TMDL, neither ODEQ nor IDEQ have signaled any independent state efforts to develop the necessary TMDL that both agencies are required to develop and agreed to have in place over thirteen years ago. The draft 401 Certifications only exacerbate ODEQ's and IDEQ's inexcusable delay. Neither agency has committed to any foreseeable timeline in which the mercury TMDL must be completed, allowing IPC to theoretically continue to study the problem for the duration of the 30 to 50-year license term without holding the company accountable to implementing any reductions in mercury or MeHg production caused or contributed by the Complex.

First, the Draft 401 Certifications should include immediate management actions aimed at significantly reducing MeHg generation within the HCC. There is ample current information and understanding of the MeHg generation process in the HCC to begin formulating and taking immediate management actions. IPC does not need to wait for the completion of a comprehensive predictive model or the completion of a comprehensive management plan to begin taking action especially given the ongoing harm to Tribal trust and public resources in and downstream of the Complex.

Second, the Draft 401 Certifications should include an accelerated schedule with explicit timelines for IPC to develop a predictive model and management plan (which should include a monitoring plan) for reducing MeHg in the HCC and in fish tissue concentrations to levels safe for unrestricted Tribal consumption. An expedited timeline for finalizing the predictive model is imperative, especially if the development of the management plan is contingent on the predictive model. The management plan should emphasize the Tribe's culturally-significant species including, but not limited to, sturgeon, lamprey, bull trout, smallmouth bass, and suckers. The Tribe is confident that IPC can and should complete this predictive model and management plan within the next five years (2024).

Third, ODEQ and IDEQ should require that IPC's interim management actions and management plan be peer reviewed and open to tribal and public comment.

Fourth, ODEQ and IDEQ should require that IPC implement the management plan for abatement of MeHg and its transport below the Complex within one year of completing the management plan (2025).

Fifth, ODEQ and IDEQ should require that IPC's actions will decrease MeHg levels to pre-HCC conditions within ten years of implementing the management plan for MeHg (2035). This timeline for decreasing MeHg levels will allow other system management options to be more readily available and exercised if necessary, including but not limited to, withdrawing cold, MeHg-free water from the reservoir hypolimnion to meet fall Chinook spawning temperature criterion in late October.

Sixth, ODEQ and IDEQ should require that IPC annually monitor MeHg levels in fish downstream of the HCC and report the results to the Tribe.

Seventh, ODEQ and IDEQ should require that IPC include the Tribe in its annual reporting to ODEQ and IDEQ regarding its cooperative studies with the USGS.

**ODEQ Response:**

As described in the mercury section of this Evaluation and Findings Report higher concentrations of methylmercury tended to occur in deeper waters in Brownlee Reservoir (see Figure 28). The methylmercury concentrations in Brownlee Reservoir sediments are elevated compared to regional or local sediment methylmercury data (Figure 30). These results indicate that the methylation processes in Brownlee Reservoir may be different from processes occurring in other reservoirs or natural lakes. USGS notes, “However, based on previous mercury research, there are characteristics within the HCC that are consistent with increased susceptibility to methylmercury accumulation” (USGS July 2016). IPC, in partnership with USGS, continues to study the Hells Canyon system to understand the spatial and temporal distribution and transport of the different forms of mercury. Because of the need to assess the characteristics of the system and understand the processes controlling mercury cycling in the Hells Canyon Complex, ODEQ thinks it is premature to require IPC to implement measures at this time. ODEQ edited the water quality certification (Section VIII.A.4) to require IPC to complete the study and the predictive model no later than one year after issuance of the FERC license, or a later date only if approved by ODEQ and IDEQ. Once submitted to ODEQ, the management plan will be public information and available upon request.

**121. Comment from Nez Perce Tribe**

Eight, ODEQ and IDEQ should, at minimum, complete within three years (2022) a mercury TMDL. They should also begin work on a MeHg TMDL. Both agencies committed to EPA to developing a mercury TMDL by 2006 but have failed to follow through with that promise. Since then, the body of evidence regarding the high methylation rates of existing mercury in the HCC reservoirs has grown, as has the evidence regarding the threat MeHg poses to fish species downstream of the HCC and to human health. Having a TMDL adopted without further delay to address mercury and MeHg in a 50-year license is essential for complying with the CWA, protecting the health of Tribal members, and protecting the Tribe's treaty-reserved fishing rights. ODEQ and IDEQ should also have explicit language in the Certifications ensuring that any mercury TMDL promulgated post-certification, for mercury, methylmercury, or otherwise, shall be enforceable against IPC as part of the 401 Certification terms and conditions during the license term. Ninth, certification conditions should require IPC to adopt specific, prescriptive measures and aggressive timelines for the HCC to achieve its load allocation under a mercury and/or MeHg TMDL. These TMDL requirements should supplement any management plan IPC develops to reduce MeHg tissue concentrations prior to ODEQ and IDEQ completing mercury and methylmercury TMDLs.

Section VIII. (Mercury) is wholly inadequate. See detailed methylmercury comments above.

**ODEQ Response:**

ODEQ creates a list of TMDLs to be developed. ODEQ submits the list to EPA as part of the Integrated Report and the Performance Partnership Grant. ODEQ may update the IR report about every two years and updates the PPG every two years. The PPG describes the work ODEQ will perform with Section 106 grants from EPA. The TMDL development list is affected by TMDL litigation, Coastal Zone Act Reauthorization Amendments gaps, and the water quality permit issuance plan. The Snake River mercury TMDL is not on the TMDL development list.

**122. Comment from National Marine Fisheries Service**

NMFS generally supports the proposal in the draft 401 certifications to continue studying mercury and mercury processing within Brownlee reservoir. This situation is unique and NMFS believes it is appropriate to spend the time necessary to determine the best course of action. In addition, it seems likely

that other measures in the draft 401 certifications (particularly those aimed at improving dissolved oxygen levels by reducing phosphorous, sediment, and aquatic vegetation) have some potential to positively affect the mercury processing by reducing anaerobic conditions that contribute to the methylation of mercury within the reservoir. However, NMFS recommends additional monitoring to ensure that the effects of mercury processing and transport associated with Brownlee reservoir on ESA-listed species are not worsening. First, we propose that fish tissue monitoring and water quality monitoring be expanded downstream of Hells Canyon Dam. Existing data indicates juvenile Chinook salmon body burdens are low (which is not unexpected given they rear in the affected area for only a few months before migrating). However, the sample size is small, and the periodic collection of additional fish tissue and water quality monitoring would ensure that conditions are not changing while other measures are being developed. More information relating to the body burdens of juvenile fish (in relation to mercury exports from the Hells Canyon Complex) would also be useful.

**ODEQ Response:**

ODEQ acknowledges the comment. ODEQ notes that NMFS has authority to analyze out-migrating fish for mercury.

**123. *Comment from Shoshone Bannock Tribes***

The Tribes have a significant issue regarding the proposed approach in the certification process to methyl-mercury. The certification would allow up to six months for the USGS to create a predictive model for methyl-mercury, and if that timeline is insufficient then IPC would be allowed to complete the predictive model. It is interesting to note that there are no interim measures associated with the certification while this model is being developed. The Tribes request interim standards be issued with the certification and a reasonable metric for reducing the overall production of methyl-mercury within the project. The risk of transporting toxic constituents is also directly related to implementing temperature control measures at Brownlee Reservoir, so this predictive model should be accorded adequate weight in the certification process.

**ODEQ Response:**

As described in the mercury section of this Evaluation and Findings Report higher concentrations of methylmercury tended to occur in deeper waters in Brownlee Reservoir (see Figure 28). The methylmercury concentrations in Brownlee Reservoir sediments are elevated compared to regional or local sediment methylmercury data (Figure 30). These results indicate that the methylation processes in Brownlee Reservoir may be different from processes occurring in other reservoirs or natural lakes. USGS notes, “However, based on previous mercury research, there are characteristics within the HCC that are consistent with increased susceptibility to methylmercury accumulation” (USGS July 2016). IPC, in partnership with USGS, continues to study the Hells Canyon system to understand the spatial and temporal distribution and transport of the different forms of mercury. Because of the need to assess the characteristics of the system and understand the processes controlling mercury cycling in the Hells Canyon Complex, ODEQ thinks it is premature to require IPC to implement measures at this time. ODEQ edited the water quality certification (Section VIII.A.4) to require IPC to complete the study and the predictive model no later than one year after issuance of the FERC license, or a later date only if approved by ODEQ and IDEQ. Once submitted to ODEQ, the management plan will be public information and available upon request.

**124. *Comment from Shoshone-Paiute Tribes***

The Tribes are extremely opposed to issue regarding the proposed approach in the certification process to methyl-mercury. The Tribes feel that there is not a current plan in place and are uncomfortable with

allowing up to six months for the USGS to create a predictive model for methyl-mercury, and if that timeline is not met then IPC would be allowed further time to complete the predictive model. The plan appears to be a “wait and see” approach. The Tribes would like to see an adoption of temporary standards issued with the certification and a reasonable metric and timeline for reducing the overall production of methyl-mercury within the project.

**ODEQ Response:**

As described in the mercury section of this Evaluation and Findings Report higher concentrations of methylmercury tended to occur in deeper waters in Brownlee Reservoir (see Figure 28). The methylmercury concentrations in Brownlee Reservoir sediments are elevated compared to regional or local sediment methylmercury data (Figure 30). These results indicate that the methylation processes in Brownlee Reservoir may be different from processes occurring in other reservoirs or natural lakes. USGS notes, “However, based on previous mercury research, there are characteristics within the HCC that are consistent with increased susceptibility to methylmercury accumulation” (USGS July 2016). IPC, in partnership with USGS, continues to study the Hells Canyon system to understand the spatial and temporal distribution and transport of the different forms of mercury. Because of the need to assess the characteristics of the system and understand the processes controlling mercury cycling in the Hells Canyon Complex, ODEQ thinks it is premature to require IPC to implement measures at this time. ODEQ edited the water quality certification (Section VIII.A.4) to require IPC to complete the study and the predictive model no later than one year after issuance of the FERC license, or a later date only if approved by ODEQ and IDEQ. Once submitted to ODEQ, the management plan will be public information and available upon request.

**125. Comment from U.S. Fish and Wildlife Service**

Both DEQs require a Methylmercury Report and Methylmercury Management Plan (MMP). The Methylmercury Report will discuss the role of the HCC in methylmercury production plus results from a Methylmercury Predictive Model (Model) as outlined for the HCC. It is unclear if additional monitoring of biota in the Snake River downstream of Hells Canyon Dam will occur for completion of the Model. In addition, the MMP should be expanded to not only include options for managing methylmercury production, but also how managing methylmercury loads through the HCC under various operational scenarios by season and water year type that may affect downstream biota. We expect that since temperature management decisions at HCC closely involve HCC operations, management of methylmercury will likely also be involved.

**ODEQ Response:**

The Hg predictive model is expected to show how various operational scenarios will affect the transport of MeHg (and the exposure of downstream biota to MeHg produced by the HCC). Accordingly, the methylmercury management plan will address HCC’s contributions to the production of MeHg as well as the transport of MeHg downstream of HCC due to HCC operations.

**126. *Comment from US Fish and Wildlife Service***

Since issuance of the FEIS in 2007, there have been evaluations (though not thorough investigations) of toxics in Brownlee Reservoir. The Service has participated in these evaluations with the DEQs, the IPC, U.S. Geological Survey (USGS), and the Environmental Protection Agency. Over 400 constituents of sediments and water were evaluated. The sediments were sampled via core samples taken at 10 locations within the bottom layers of Brownlee Reservoir in 2012. Most of the tested constituents came back in low concentrations or were non-detectable. However, methyl mercury production was a noted outlier in the water analysis, and has since been a focus for comprehensive analysis by the USGS.

At the time of the evaluation, the involved parties acknowledged that the analysis was only a screening level survey because Brownlee Reservoir is over 50 miles long and contaminants are rarely evenly distributed throughout a reservoir system. Initial results suggest further monitoring for a variety of constituents will be needed. Since Brownlee is the largest receiving body of water for runoff from the Snake River Plain, it is likely that the sediments are not only capturing Snake River contaminants, but also processing them through bacterial processes in the upper sediment strata under anaerobic conditions. These processes are, in part, subject to further study by USGS for methylation of mercury. It is important that a Sediment Management Plan for Brownlee Reservoir be developed including further monitoring of sediments, cycling processes and evaluation of the consequences of potentially disturbing those processes if Alternative Measures Plan B, as currently proposed, is implemented. We recommend the development of a Brownlee Sediment Management Plan to help inform any downstream management decisions, including potential actions in Endangered Species Act (ESA)-designated bull trout critical habitat.

**ODEQ Response:**

IPC Application Exhibit 6.6-2 summarizes available sediment data, including the data cited in the comment. In 2012, USGS, in cooperation with IPC, collected water-column and bed-sediment core samples from eight sites in Brownlee Reservoir. The bed sediment samples were analyzed for total mercury and methylmercury. Additional bed-sediment core samples, collected from three of the eight sites, were analyzed for pesticides and other organic compounds, trace metals, and physical characteristics, such as particle size. As noted in Exhibit 6.6-2, “The bed-sediment core samples from sites 1, 5, and 8 were analyzed for 417 pesticides and other organic compounds. Only 17 of the 417 analytes were detected at or greater than the reporting level, and 11 of the detected analytes were wastewater compounds. Other organics detected in the bed sediment cores included the herbicides 2,4-Dichlorobenzoic acid and pentachlorophenol along with the pesticides 4,4'-DDE, pendimethalin, prometon, and propoxur; 4,4'-DDE was detected in all sediment samples that were analyzed” (Page 27). Additionally, trace metals were detected at greater than the reporting level in all bed-sediment core samples submitted for analysis. The trace metals arsenic, copper and nickel all exceeded the each exceeded the threshold effect concentration (TEC), but were less than the probable effect concentration (PEC) for freshwater ecosystem. As noted in Exhibit 6.6-2 “Because the concentrations were between the TEC and PEC, a determination of toxicity could not be determined” (Page 27). Total methylmercury in the bed sediment was largest near the sediment-water interface and decreased substantially with depth. As noted in the Application, “Current data from Brownlee Reservoir indicate Reservoir sediments have average levels of total mercury but high levels of methylmercury (Harris and Beals 2013; Krabbenhoft 2012)” (Page 146). Based on these and earlier results, methyl mercury was identified as a parameter for further study.

**127. *Comment from Idaho Conservation League***

Instead of waiting for the predictive model to be finalized, we suggest utilizing historical data in conjunction with currently available tools to develop an interim methylmercury management plan, with a stipulation in the 401 Certification requiring the management plan to be updated following the completion

of the predictive model. For example, the EPA's SERAFM conceptual model<sup>5</sup> could be utilized to estimate historic and current natural background MeHg concentrations in the water column, sediment, and fish tissue. Model results could then be compared to historic data in an effort to isolate the impact the HCC has on mercury concentrations. Again, this effort would only be utilized until the USGS completes their site-specific predictive model.

The draft 401 certification notes that if USGS is unable to complete their methylmercury production study then IPC will be responsible for completing the study and developing the predictive model. However, it is unclear when or what would necessitate such a transition and the timeframe over which it would occur. IDEQ, IPC, or the USGS should indicate how they would make the decision that the USGS is unable to complete the study. We are curious if there is a timeframe associated with the USGS's attempts (i.e. – if the predictive model is not completed within a year then IPC will take over) or if the transition would be required due to lack of resources from the USGS. In any case, it is important to identify and adhere to these decision factors so the development of the predictive model is not unnecessarily delayed.

**ODEQ Response:**

As described in the mercury section of this Evaluation and Findings Report higher concentrations of methylmercury tended to occur in deeper waters in Brownlee Reservoir (see Figure 28). The methylmercury concentrations in Brownlee Reservoir sediments are elevated compared to regional or local sediment methylmercury data (Figure 30). These results indicate that the methylation processes in Brownlee Reservoir may be different from processes occurring in other reservoirs or natural lakes. USGS notes, "However, based on previous mercury research, there are characteristics within the HCC that are consistent with increased susceptibility to methylmercury accumulation" (USGS July 2016). IPC, in partnership with USGS, continues to study the Hells Canyon system to understand the spatial and temporal distribution and transport of the different forms of mercury. Because of the need to assess the characteristics of the system and understand the processes controlling mercury cycling in the Hells Canyon Complex, ODEQ thinks it is premature to require IPC to implement measures at this time.

ODEQ edited the water quality certification (Section VIII.A.4) to require IPC to complete the study and the predictive model no later than one year after issuance of the FERC license, or a later date only if approved by ODEQ and IDEQ. Once submitted to ODEQ, the management plan will be public information and available upon request.

**128. *Comment from Upper Snake River Tribes Foundation***

The methylation of mercury within the HCC is driven by several factors, which include an influx of nutrients and dissolved organic carbon. Methylation within the HCC is occurring not only near the bottom sediments, but also in the mid-reservoir level near the metalimnion or thermocline, indicating that the management of Brownlee Reservoir itself is contributing to the methylation of mercury. While mercury is added to the system by incoming flows, the management of reservoir levels and other factors within Brownlee Reservoir affect mercury methylation, so it is inaccurate to assert that IPC's HCC is not a primary contributor to methylmercury violations.

Should the SRSP not be effective in meeting the salmonid spawning temperature requirements, then "Plan B" implementation would be required by the DEQ's for the attainment of temperature criteria. Plan B calls for the construction of a hypolimnetic pumping system (HPS) that would bring cold water up from the hypolimnion of Brownlee Reservoir, where water quality conditions are extremely impaired primarily due to mercury/methyl mercury and low dissolved oxygen levels that are driven by high nutrient levels. IPC notes there are "serious unanswered questions" to the construction and operation of an HPS due to mercury/methylmercury concerns.

Currently, USRT does not support Plan B. USRT believes that until the United States Geological Survey (USGS) Mercury Study is complete, and a full understanding of methylation within the HCC, including the fate and transport of mercury within the HCC and downstream of the Hells Canyon Dam, that Plan B should not be considered as a viable option to the TMCP/SRSP. IPC states in their application that the USGS Mercury Study will take an estimated 10 years. We question the DEQ's "reasonable assurance" that Plan B is a viable option to the SRSP in absence of final conclusions from the USGS Mercury Study; particularly considering IPC realized that there are serious unanswered questions surrounding an HPS at Brownlee Reservoir. USRT suggests that IPC be required to produce a methylmercury management plan within 180 days of the 401 certification portion of the license. It is our position that waiting for the predictive model could potentially delay implementation of important mitigation measures. Management plans should be working documents and must be reviewed and updated as new information is learned.

**ODEQ Response:**

As described in the mercury section of this Evaluation and Findings Report higher concentrations of methylmercury tended to occur in deeper waters in Brownlee Reservoir (see Figure 28). The methylmercury concentrations in Brownlee Reservoir sediments are elevated compared to regional or local sediment methylmercury data (Figure 30). These results indicate that the methylation processes in Brownlee Reservoir may be different from processes occurring in other reservoirs or natural lakes. USGS notes, "However, based on previous mercury research, there are characteristics within the HCC that are consistent with increased susceptibility to methylmercury accumulation" (USGS July 2016). IPC, in partnership with USGS, continues to study the Hells Canyon system to understand the spatial and temporal distribution and transport of the different forms of mercury. As USGS notes, "Because the mercury dynamics in the HCC are not well understood, however, it is not clear how altering releases from Brownlee Reservoir would affect mercury cycling within the HCC, and whether changes in operations would increase methylmercury exposure to downstream species" (USGS July 2016).

ODEQ edited the water quality certification (Section VIII.A.4) to require IPC to complete the study and the predictive model no later than one year after issuance of the FERC license, or a later date only if approved by ODEQ and IDEQ. Once submitted to ODEQ, the management plan will be public information and available upon request.

Section II.F.3.a.ii of the water quality certification requires IPC to evaluate whether any proposed alternative temperature measure, including Plan B, might cause or contribute to a violation of water quality standards. When evaluating a proposed temperature alternative measure, ODEQ will consider the mercury studies and any other applicable water quality study to determine whether the Project's operations, including proposed measures, will cause or contribute to a violation of water quality standards. IPC will be required to detail the actions needed to prevent violation of water quality standards.

## 10.15 Sediment

**129. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited***

Support for EPA's Sediment Reduction Program as Part of the TMCP In its comments on the 2016 draft 401 conditions, EPA recommended the implementation of a sediment reduction program upstream of the HCC as well as the formation of a stakeholder advisory committee to provide input on the selection of restoration sites. We support these recommendations by EPA.



**ODEQ Response:**

ODEQ notes that EPA did not provide comments on the draft water quality certification. As required in Section III.A.3 of the water quality certification IPC is implementing the Grand View Sediment Reduction Program.

## 10.16 Flow

**130. *Comment from Nez Perce Tribe***

The Draft 401 Certifications made no changes to IPC's proposed load following regime. This is problematic because load following negatively affects aquatic species. Fluctuating river flows from load following can lead to dewatering redds, stranding, increased predation risk, and excessive energy expenditures for various aquatic species including juvenile fish and macroinvertebrates. In order to protect redds and juvenile fish, ODEQ and IDEQ should prohibit load following from October 21 to December 11, when adult fish are spawning, and from March 15 to June 15, when juvenile fish are rearing. Redds and juvenile fish should experience relatively natural flows. ODEQ and IDEQ should also require IPC to conduct a study on load following's effect on juvenile behavior and survival.

**ODEQ Response:**

In its 2006 Section 10(j) submission to FERC, the Oregon Department of Fish and Wildlife recommended a 4 inch per hour ramping rate during fall Chinook rearing (mid-March thru mid-June). FERC in its FEIS concurred with this recommendation. IPC proposed "A Juvenile Chinook Salmon Entrapment Management Plan for the Upper Hells Canyon Reach of the Snake River" in lieu of the 4 inch per hour ramping rate. ODEQ, in consultation with ODFW, determined that the Juvenile Chinook salmon plan and the summer entrapment monitoring plan are as protective to fall Chinook as the 4 inch per hour ramping rate. ODEQ included the entrapment plans as conditions in the water quality certification.

## 10.17 Monitoring

**131. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited***

Require Additional Modeling: Require continuous monitoring of temperature, toxics, dissolved oxygen, methylmercury, total dissolved gas, turbidity and other constituents at strategically located sites, as determined by the DEQs, EPA, NOAA Fisheries, U.S. Fish and Wildlife, tribes and stakeholders. Monitoring results should be made available to the public.

**ODEQ Response:**

The water quality certification describes the temperature, dissolved oxygen, total dissolved gas, and harmful algal blooms monitoring required of IPC. The water quality certification also requires IPC to continue the mercury study and associated monitoring. Pursuant to Oregon public records law, data and reports submitted by Idaho Power Company are available upon request.

**132. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited***

Monitor Chinook Viability: Continuing assessments of fall Chinook population viability need to be made to assess the ability of naturally produced fish to sustain the population. Underwater video surveys should be conducted to assess the extent of pre-spawning mortality and timing of spawning. Results need to be

promptly published and fully accessible to the public. Egg retention in carcasses needs to be assessed to differentiate spawned vs. un-spawned fish.

**ODEQ Response:**

ODEQ acknowledges the comment. ODEQ finds IPC's proposed activities, as conditioned, may be conducted in a manner that will not violate applicable water quality standards. The physical and chemical habitat requirements of fish and aquatic life (e.g. temperature, dissolved oxygen, pH, etc.) are considered during the development of water quality standards by the Environmental Quality Commission and ODEQ.

**133. Comment from Nez Perce Tribe**

Require monitoring plans (Sections IL.D, III.B, IV.B, IX.C) to be completed within 120 days of receiving DEQ 401 certification. It is unnecessary to wait until FERC issues a new license to require a monitoring plan and doing so may preclude critical data collection. The finalization of these plans should include a co-manager (tribal) review period. Expand proposed temperature monitoring locations (Section II.D.1) to include Pittsburg Landing and just upstream of the Salmon River confluence.

**ODEQ Response:**

The second paragraph of the certification states "Upon Federal Energy Regulatory Commission ("FERC") issuance of a license to Idaho Power Company for the Hells Canyon Complex Hydroelectric Project ("Project"), Idaho Power Company must comply with the following § 401 Certification conditions:"

**134. Comment from Washington Department of Ecology**

Monitoring - The inclusion of EPA's proposed continuous temperature monitoring. Locations that are representative of the Snake River above and below the Snake River instream restoration project area (i.e., above Walter's Ferry and below Homedale), flowing into Brownlee Reservoir, within Brownlee Reservoir, within Oxbow Reservoir, within Hells Canyon Reservoir, and within three miles downstream of the Hells Canyon Dam.

**ODEQ Response:**

ODEQ notes that EPA did not provide comments on the draft water quality certification.

Section II.D of the water quality certification requires IPC to propose monitoring locations representative of the Snake River flowing into Brownlee Reservoir, within Brownlee Reservoir, within Oxbow Reservoir, within Hells Canyon Reservoir, flowing out of Hells Canyon Dam, and within three miles downstream of the Hells Canyon Dam. Additionally, IPC will as part of the SRSP, IPC will conduct a 3-tiered approach to project monitoring:

- (1) Qualitative monitoring at all sites.
- (2) Remote effectiveness monitoring at all sites.
- (3) Quantitative monitoring on a selected sample of projects representative of the instream habitat and riparian revegetation project types.

ODEQ edited Section II.E.2 to require the three tiers of monitoring set forth above.

**135. Comment from Washington Department of Ecology**

Public access to monitoring data - A requirement that all quality-assured data be posted to a publicly accessible website.

A requirement that all of the items described in the annual temperature reports (a through h), including the proposed edits by EPA, be posted to a publicly accessible website. This will give Washington and the public adequate information to provide useful comments on ODEQ and IDEQ's response to the annual reports.

**ODEQ Response:**

ODEQ notes that EPA did not provide comments on the draft water quality certification.

Pursuant to Oregon public records law, all reports and data submitted to ODEQ by IPC are available upon request.

## 10.18 Studies

136. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited*

Additional Studies of Temperature Effects on Salmonid Spawning: More studies on the impacts that river temperatures may be having on fall Chinook in the Snake River are needed. There has been much debate and disagreement as to the actual impact current pre-spawning temperatures are having on fall Chinook and their offspring. In coordination with the appropriate federal and state fish and wildlife agencies and tribes, IPC will further develop and implement studies to ascertain the impact of temperature on fall Chinook.

**ODEQ Response:**

The water quality certification addresses the proposed activities compliance with Oregon's water quality standards as required in Oregon Administrative Rules 340-048-0010(1). ORS 468B.040. ODEQ considered this comment in its certification decision. The purpose of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 USC 1251(a). States have ongoing authority to ensure compliance with applicable standards.

## 10.19 Exhibit A – Proposed Operations

137. *Comment from National Marine Fisheries Service*

Footnote 5 and 8 should be clarified. NMFS has not issued a biological opinion on FERC's licensing of the Hells Canyon Complex so no requirements exist to be consistent with at this time. NMFS expects FERC to request formal ESA consultation prior to issuing a new license, following completion of all necessary processes (including issuance of Final Water Quality Certifications by both the Oregon and Idaho Departments of Environmental Quality).

Footnote 6 indicates that the compliance point for ramp rate and flow measurements will occur at Johnson Bar Gage, approximately 18 miles downstream of Hells Canyon Dam. Please clarify the relationship, if any, of this compliance point to the requirement in the Macroinvertebrate Monitoring Plan to measure and report "river state at a location within 5 miles downstream of Hells Canyon Dam."

**ODEQ Response:**

ODEQ edited the footnotes to the proposed operations table in Exhibit A to the water quality certification to make the suggested clarification that noted requirements are consistent with the existing Hells Canyon Biological Opinion. Ramping rates will be measured at the Johnson Bar Gage. However, Section IX.B.1.d requires measurement and reporting of river state within 5 miles downstream of Hells Canyon dam. The data collected at this location will be utilized and evaluated by DEQ for other purposes. As one example, this data is part of the macroinvertebrate study and intended to provide information on river stage during macroinvertebrate sampling.

## 10.20 Authority

### 138. *Comment from Oregon Farm Bureau, Malheur Watershed Council, Malheur County Farm Bureau, Malheur Soil and Water Conservation District*

The 401 Certification Should be Amended to Remove the Requirement for “Placement” of Fish Above the Dam. In our previous comments, OFB’s primary concerns was that the 401 Certification required fish passage and reintroduction of ESA listed spring Chinook and steelhead above the Hells Canyon Dam. In the updated 401 Certification, this appears to be converted to a program that requires “placement” of fish above the dam, which is effectively a reintroduction plan that is less onerous on IPC. We have the same concerns with placement that we had with reintroduction in the previous plan.

We continue to believe that Oregon DEQ does not have the authority to require placement of salmon as a water quality condition. While many of Oregon’s water quality standards are based on the life cycle needs of salmonid fish, those standards do not equate to the fish themselves. Instead, those standards provide the water quality conditions necessary to support the species if they exist in the waterway, which they do not here.

DEQ’s movement away from water quality conditions represents an unprecedented extension of DEQ into the realm of fish placement/reintroduction. DEQ has no standard relating to placement, and DEQ rules for water quality protection in the basin do not include protection of anadromous fish. However, DEQ’s proposed conditions are based on a novel interpretation of its own standards relating to water quality. These conditions open the door for DEQ to impose such requirements in connection with any other state projects requiring 401 certification or interpretation of DEQ standards. To require placement of an extirpated species as a condition of a water quality certification far exceeds the scope of DEQ’s authority, and does not constitute a water quality condition. DEQ must remove these conditions. Importantly, these conditions would also impose an enormous burden on landowners and water users in Northeastern Oregon and jeopardize their vested water rights.

Placement of native migratory fish will place existing water users at risk of future regulation or limitations on water use and water management. This will have significant economic implications for farming and ranching in the area due to increased regulatory requirements and higher electricity costs. Based on our experience in other areas, placement/reintroduction of a listed species carries considerable risk for agriculture. For example, reintroduction can trigger requirements for fish screening, consultation on operations with federal agencies if these species are relisted, prohibitions on diversions, court-ordered injunctions, expensive screening devices, and additional instream flow requirements that adversely affect the ability to grow the food and fiber that we are proud to provide in Oregon. To propose to impose these conditions on the HCC Project without the benefit of any public process designed to notify upstream landowners about the proposed condition is unacceptable.

#### **ODEQ Response:**

The recitals of the Settlement Agreement describe the purpose for that Agreement, and the document speaks for itself.

## 10.21 Climate Change

### 139. *Comment from American Rivers, Idaho Rivers United, Columbia Riverkeeper, Pacific Rivers, Trout Unlimited*

On page 73 of the Draft Evaluation and Findings Report, ODEQ acknowledges climate change is occurring and identifies some of the likely impacts, including, warmer stream temperatures, reduced spring and summer streamflows, increased peak river flows and increasing susceptibility to fish pathogens and parasitic organisms that are injurious when fish become thermally stressed. However, ODEQ does not fine-tune this general finding and apply to the HCC project area, nor does it explain how climate change factored into the development of draft conditions. There are numerous models available that would allow the DEQs to determine the likely impacts of climate change in the Snake River and how presence and operation of the HCC affects stream flows, temperature and other water quality considerations. Given the severity of predicted impacts likely to occur during the new license term, we request the DEQ's provide further detail of Snake River specific impacts of climate change and how the presence and operation of the HCC will affect and mitigate the likely water quality impacts.

Climate change is predicted to have meaningful impact on air and water temperatures throughout the license period. There is no evidence that the impact of climate change predictions were factored into the development of the TMCP or SRSP. Simply put, the stream temperature and water quality problems that exist throughout the Snake River, below, within and above the project area, are too large and complex to address with a watershed restoration only approach. Further, climate change demands that we take immediate action to provide relief from the existing lethal and sub-lethal temperature regime.

#### **ODEQ Response:**

According to Furniss et al (2010) "Numerous and diverse observations during the last decades of the 20th century show that the Earth's climate is currently warming and precipitation is increasing" (Page 14). For example, lower elevations are receiving more precipitation as rain and less as snow. Furniss et al (2010) notes "Observed global warming is linked to these changing precipitation patterns as well as to sea level rise, decreases in snow and ice extent, and changes in the frequency and intensity of extreme events such as heat waves, drought, and heavy rainfall" (Page 14). Regional projections project the Pacific Northwest to have much greater warming (temperature increasing by 3°F by the 2030s) and more precipitation in the winter and less precipitation in the summer (Furniss et al 2010, Page 17). Improving and sustaining watershed resilience is one strategy to respond to climate change. Several practices can be considered to maintain and improve watershed resilience, including minimizing temperature increases by maintaining well-shaded riparian areas and limiting groundwater withdrawals, protect and restore riparian near-stream habitats and wetlands, and ensure that fish have access to seasonal habitats, such as off-channel or cool-water areas (Furniss et al 2010).

Under the Snake River Stewardship Program (SRSP), IPC proposes to complete instream habitat restoration projects that will reduce surface area exposure to thermal loading from the sun, including island enhancements, island creation, inset floodplain development, and emergent wetland development. As noted by IPC "Process-based restoration in the Snake River is designed to achieve habitat characteristics for fall Chinook salmon, white sturgeon, mountain whitefish, and Snake River Physa. Restoration actions designed for multiple species will increase overall habitat heterogeneity in the Snake River, increasing biodiversity and thus ecosystem resilience (June 2018 application for water quality certification, Exhibit 7.1-5, Page 18).

As part of the SRSP, IPC also proposes to implement riparian revegetation projects in the Snake River and its tributaries, which will produce shade and block thermal loading from the sun. Both

the riparian revegetation project and the instream habitat restoration projects will help to maintain and improve watershed resilience as described by Furniss et al (2010).

Other researchers have been studying strategies to limit global warming or mitigate its effects on aquatic life. Water temperature influences the distribution, growth and survival of fish and other aquatic life (Justice, White, McCullough, Graves, & Blanchard, 2016). Also noted by Justice et al (2016) “As stream temperature regimes change in response to land management and climate change, cold-water fishes such as Chinook Salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*) may be exposed to temperatures that are outside of their physiologic optimum, resulting in changes to fish communities and potential increased risk of extinction” (Poole et al., 2001; Urban, 2015, as cited in Justice et al 2016). Justice et al (2016) developed a temperature simulation model to evaluate whether climate change impacts could be offset by riparian and channel restoration actions in the Upper Grande Ronde River and Catherine Creek basins in Northeast Oregon. The researchers noted that although projected climate change impacts on water temperature were substantial, basin-wide restoration of riparian vegetation and channel width could offset these impacts, and reduce peak summer water temperature. While this study focused on the Grande Ronde basin, the results may be transferable to the watersheds addressed in the SRSP.

Dybala et al (2018) studied the riparian biomass and soil carbon data from numerous data sets and modeled the change in carbon stock as a function of vegetation age. The authors noted that models predicted that the establishment of riparian forest would more than triple the baseline, unforested carbon stock. Dybala et al (2018) noted, “Our results demonstrate that carbon sequestration should be considered a strong co-benefit of riparian restoration, and that increasing the pace and scale of riparian forest restoration may be a valuable investment providing both immediate carbon sequestration value and long-term ecosystem service returns.” As noted above, the SRSP includes proposals to revegetate the Snake River and its tributaries. Based on the work of Dybala et al (2018), the revegetation projects will likely increase carbon stock in the tree biomass and soil. ODEQ concludes that the SRSP makes the system more resilient to climate change.

#### 140. *Comment from Nez Perce Tribe*

It is unclear if or how the Draft 401 Certification requirements account for climate change. The Tribe witnessed significant sockeye and spring Chinook mortality in 2015 due to abnormally high water temperatures associated with a changing climate. It is important that actions be taken to alleviate these lethal conditions as much as possible, considering that the HCC control much of the river flow that the adult migrants experience. The only mention of climate change in the Draft 401 Certifications and accompanying documents, however, is found on page 73 of Oregon's Evaluation and Findings Report. The report states: There is strong scientific evidence demonstrating that the earth is experiencing a rapid acceleration of global temperatures. Experts predict a faster rate of global warming in the next 100 years than experienced in the last 10,000 years. Climate change is likely to have harmful effects on fish and aquatic life as a result of impacts, such as but not limited to, warmer stream temperatures; reduced spring and summer stream flows with increased peak river flows; and increasing susceptibility to fish pathogens and parasitic organisms that are generally not injurious to their host until the fish become thermally stressed. Although this acknowledgement is heartening, Oregon and Idaho need to explain how their draft 401 certification conditions will ensure that water quality standards will be met (relative to minimum suitability standards) in the face of changing weather and precipitation patterns resulting from climate change. As Oregon's Evaluation and Findings Report notes, climate change is likely to result in elevated water temperatures that will have a harmful effect on aquatic life. Changing hydrologic regimes, including reduced summer flows and reduced winter precipitation, may also result in elevated dissolved gas in the Snake River or other changes in water quality that could also be deleterious to aquatic life. The

Tribe would like assurance that these possible changes have been accounted for in the Draft 401 Certifications.

**ODEQ Response:**

Please see response to comment # 139.

**141. *Comment from Idaho Conservation League***

If reissued, the FERC license for the HCC would cover operations for multiple decades. The 401 Certifications issued by Idaho and Oregon are vital components of this relicensing process necessary to protect water quality. The successful operation of the HCC, and compliance with each state's water quality standards, is inherently tied to the effects of climate change through forecasts of hydrologic conditions, such as variable timing and magnitude of river flows and the temperature of inflowing water. This inherent dependency means that the effects of climate change may directly undercut assumptions in the 401 Certifications.

Idaho is already experiencing the effects of climate change, and it's critical that permits or certifications include adaptive management provisions such that operations can respond to current and upcoming stressors resulting from climate change. We request that each DEQ include provisions in their 401 Certification stipulating their right to reopen this FERC license at any time in light of climate change and its effects on the assumptions made within these 401 Certifications.

**ODEQ Response:**

Please see response to comment # 139.

**142. *Comment from Upper Snake River Tribes Foundation***

To meet TMDL temperature load allocations, Idaho and Oregon salmonid spawning criteria, and Oregon's migration corridor temperature criteria, IPC must implement a Temperature Management and Compliance Plan (TMCP) that is largely composed of the Snake River Stewardship Program (SRSP), and to a lesser extent the Brownlee Operation Plan. Under the TMCP, IPC will be given 15 years to attain half, and 30 years to attain all their thermal benefits at the inflow of the HCC from the SRSP, with Brownlee operation providing mitigation during years that are expected to exceed 160C below Hells Canyon Dam. Because of the higher water temperatures observed above Hells Canyon in 2015, 2016, and 2017, we are increasingly concerned about the effectiveness of this temperature control program to provide any lasting water temperatures less than 160C below Hells Canyon Dam. We support improvements made to upstream habitat which have a net benefit of reducing surface water temperatures and improving overall habitat, however, as previously stated, we disagree with allowing IPC up to 30 years to meet salmonid spawning temperature requirements. Chinook salmon and bull trout are already imperiled, allowing IPC to continue to violate temperature criteria for decades will only lead to further endangerment of the species. Further, there seems to be little consideration of the impacts of climate change on water temperatures upstream, within, and downstream of the HCC. Any calculations in improved water temperatures should simultaneously account for a changing climate.

USRT has finalized a climate change vulnerability assessment for the Upper Snake River Watershed, which includes the HCC. The assessment has concluded that by the 2050's, if global greenhouse gas emissions continue on their current path (referred to as Representative Concentration Pathway (RCP) 8.5), at minimum, average annual temperatures will increase 5°F in the fall and at maximum, 9.5°F in the winter. Because of these anticipated seasonal temperature increases, the USRT assessment finds that Chinook salmon are extremely vulnerable to the effects of climate change by the 2050's. Under the "best case scenario" (RCP 4.5), global greenhouse gas emissions will peak by the 2040's before they begin to

decline. Chinook salmon are expected to be extremely vulnerable to climate change due to an increase in surface water temperatures. USRT does not believe that the 30-year timeline for the reduction in temperatures allotted to IPC will sufficiently protect the species. USRT believes thermal reductions should be achieved on a shorter timeline, maximum 10 to 20 years.

**ODEQ Response:**

Please see response to comment #139.

## 10.22 Changes to Water Quality Standards

### 143. *Comment from Shoshone Bannock Tribes*

Throughout the licensing process, the Tribes have reiterated our understanding that the science surrounding the purpose of cold-water standards in anadromous waters has not changed dramatically in the past several years. Further, it continues to be factually accurate that operations at the HCC have not resulted in a significant increase in the populations of listed species below the facilities. A change in water quality standards is not based on the needs of the species being impacted, the end users of electricity, or the actual users of the Snake River below the HCC; it is a politically expedient way to subsidize the ongoing habitat degradation which pushes the thermal limits of salmonids of the Snake River for the benefit of a private industry.

It is the duty of the certification process to ascertain whether the proposed river management regime is in the best interests of all equally situated parties in the licensing process and will comply with the applicable standards of federal, state, and local laws. The Tribes remain optimistic that the States will require a strict adherence to the applicable standard especially given the performance of the species in the past decade. Although the science appears to demonstrate that tolerance levels for the focal species may be higher than initially anticipated, it is noteworthy that Idaho Power seeks to implement a temperature regime that rises dangerously close to the thermal limits of salmonids where higher levels of mortality may occur at the project site and may contribute to catastrophic mortalities of migrating fish lower in the system. The Tribes would like to clearly state that we are unequivocally opposed to lowering the water quality standards associated with the HCC. It remains our position that the primary focus of the certification process should be to create a workable solution that allows for the Snake River to be clean and cold for future generations.

**ODEQ Response:**

ODEQ based the water quality certification on the applicable water quality criteria. ODEQ did not consider any criteria other than the criteria that are in Oregon Administrative Rules, Division 041.

As noted in this Evaluation and Findings Report, the temperature criterion is 20°C for the protection of Redband or Lahontan Cutthroat Trout from Hells Canyon Dam to Idaho border.

The Snake River from the Oregon/Washington Border to Hells Canyon Dam (RM 169 to RM 247.5) is designated for Salmon and Steelhead Migration Corridors with an applicable criterion of 20°C, as well as narrative requirements for sufficient cold-water refugia and alignment with the natural seasonal thermal pattern.

The Snake River below the Hells Canyon dam is designated for Salmon and Steelhead Spawning through Fry Emergence. The Salmon and Steelhead Spawning through Fry Emergence designated use applies from October 23 through April 15 from below Hells Canyon Dam to the confluence with the Salmon River (RM 188) and from November 1 through May 15 from the confluence with the Salmon River to the OR/WA border (RM 169), with an applicable criterion of 13°C.



**144. *Comment from Shoshone-Paiute Tribes***

The Tribes are quite concerned about the failure to mitigate for temperature issues that impact anadromous and resident fish below the project. Under the current proposal, the States would allow seasonal fluctuations in the Snake River temperature regime that would range from 13-16 degrees Celsius. The initial position taken by the DEQ and other interested parties was to maintain a temperature of 13 degrees C or lower to protect fall Chinook populations in the Hells Canyon Reach of the Snake River. IPC presents several laboratory studies to affirm their position that the existing flow regime does not appreciably reduce the likelihood of survival for all life stages of fall Chinook. However, it should be noted that the very studies presented demonstrate that the current temperature regime allows for spawning, but it is not optimal for anadromous fish. Unfortunately, the proposal does not list any measures to decrease the temperature to the optimal regime.

The application and accompanying materials noted that there are a multitude of unknown variables that could influence survival rates below the HCC; however, those references are used to support the IPC application rather than being proposed for further study. The Tribes have reservation with the concept of proceeding with the proposed criteria for temperature regimes below HCC, without the call for further and future research. Especially, given forecasts of future climate change and Though the Tribes have significantly different views on passage than IPC, there are multiple species of listed species below HCC that need to mitigated for including but not limited to Chinook Salmon and Bull Trout.

Throughout the licensing process the Tribes have reiterated our understanding that the science surrounding the purpose of cold-water standards in anadromous waters has not changed dramatically in the past several years. The Tribes feel the change in water quality standards is not based on the needs of the species being impacted, the end users of electricity, or the actual users of the Snake River below the Hells Canyon Complex; it is a politically expedient way to subsidize the ongoing degradation of the Snake River for a private industry.

It is the duty of the certification process to ascertain whether the proposed river management regime is in the best interests of all equally situated parties in the licensing process and will comply with the applicable standards of federal, state, and local laws. The Tribes remain optimistic that the States will require a strict adherence to the applicable standard, especially given the performance of the species in the past decade. Although the science appears to demonstrate that tolerance levels for the focal species may be higher than initially anticipated, it is noteworthy that Idaho Power seeks to implement a temperature regime that rises dangerously close to the point where higher levels of mortality occur. The Tribes would like to clearly state that we are unequivocally opposed to lowering the water quality standards associated with the Hells Canyon Complex. It remains our position that the primary focus of the certification process should be to create a workable solution that allows for the Snake River to be clean and cold for future generations.

**ODEQ Response:**

ODEQ based the water quality certification on the applicable water quality criteria. ODEQ did not consider any criteria other than the criteria that are in Oregon Administrative Rules, Division 041.

As noted in this Evaluation and Findings Report, the temperature criterion is 20°C for the protection of Redband or Lahontan Cutthroat Trout from Hells Canyon Dam to Idaho border.

The Snake River from the Oregon/Washington Border to Hells Canyon Dam (RM 169 to RM 247.5) is designated for Salmon and Steelhead Migration Corridors with an applicable criterion of 20°C, as well as narrative requirements for sufficient cold-water refugia and alignment with the natural seasonal thermal pattern.

The Snake River below the Hells Canyon dam is designated for Salmon and Steelhead Spawning through Fry Emergence. The Salmon and Steelhead Spawning through Fry Emergence designated use applies from October 23 through April 15 from below Hells Canyon Dam to the confluence with the Salmon River (RM 188) and from November 1 through May 15 from the confluence with the Salmon River to the OR/WA border (RM 169), with an applicable criterion of 13°C.

## 10.23 Certification Edits

### 145. *Comment from Idaho Power Company*

(Page 3): Section II. Temperature, Subsection C.6.b.

Insert “7-day average maximum temperature conditions” after “target” in the second line. This clarifies how the target is measured.

#### **ODEQ Response:**

ODEQ edited the certification to address this comment.

### 146. *Comment from Idaho Power Company*

(Page 6): Section II. Temperature, Subsection E.4. h.

IPC requests ODEQ review the reference to “the upland sediment reduction program.” This appears to be referencing the Grand View Sediment Reduction Program that is currently being proposed as part of IPC’s dissolved oxygen mitigation program. IPC requests the sentence referring to the upland sediment reduction program be deleted from the temperature section.

#### **ODEQ Response:**

ODEQ edited the certification to address this comment.

### 147. *Comment from Idaho Power Company*

(Page 9): Section II. Temperature, Subsection F.5.

This section provides that IPC shall implement the TAMP upon DEQ approval. This requirement ignores the role FERC has in modifying FERC license conditions. Implementation may require FERC authorization. This section should be revised to reflect that IPC will implement upon DEQ and FERC approval where FERC approval is required.

#### **ODEQ Response:**

ODEQ did not edit the certification based on this comment. A condition stating that a specified action requires approval by ODEQ does not and should not be construed as limiting what other authorizations IPC may also deem necessary.

### 148. *Comment from Idaho Power Company*

(Page 10): Section III. Dissolved Oxygen (“DO”)—Brownlee Reservoir TMDL Load Allocation, Subsection B. 1.c.

IPC is unclear what ODEQ is intending by “end of system runoff.” IPC proposes that for clarity this language be changed to, “in the water returning to Snake River at the end of the Riverside Canal.”

**ODEQ Response:**

ODEQ edited the certification condition to address this comment, to clarify data collection at the end of the canal delivery system.

**149. Comment from Idaho Power Company**

(Page 10): Section III. Dissolved Oxygen (“DO”)—Brownlee Reservoir TMDL Load Allocation, Subsection B. 4.

ODEQ requires submittal of dissolved oxygen (DO) annual reports at the end of each calendar year. IPC requests that ODEQ modify this requirement to within 120 days of December 31st of each year to allow time for lab analysis of TP and TSS and processing of streamflow data, collected up to the end of year, to be completed.

**ODEQ Response:**

ODEQ edited the certification to address this comment.

**150. Comment from Idaho Power Company**

(Page 11): Section III Dissolved Oxygen (“DO”)—Brownlee Reservoir TMDL Load Allocation, Subsection B.5.

ODEQs require submittal of DO Five-Year Reports at the end of every fifth calendar year. IPC proposes this requirement be changed to within 120 days of December 31st of every fifth calendar year to allow time for completion and inclusion of DO annual reports.

**ODEQ Response:**

ODEQ edited the certification to address this comment.

**151. Comment from Idaho Power Company**

(Page 14): DO—Section IV. DO—DO Criteria Below Hells Canyon Dam. A.1.

For clarity purposes, IPC requests that ODEQ explicitly state that aeration requirements and targets only apply when DO conditions do not meet standards, and that aeration targets are not intended to require oxygen conditions in excess of the applicable standards.

**ODEQ Response:**

ODEQ disagrees with the statements in this comment. The dissolved oxygen criteria apply year round. ODEQ reviewed the data presented in IPC’s July 2018 application for water quality certification and determined that violations of the dissolved oxygen criteria are likely to occur from July 1 through December 31, but that IPC is required to comply with Section III of the water quality certification year round in order to provide reasonable assurance of compliance with applicable standards.

**152. Comment from Idaho Power Company**

(Page 14): Section IV. DO—DO Criteria Below Hells Canyon Dam.A.3.

The draft certification specifically identifies the turbine water intake system at Hells Canyon Dam as the compliance monitoring location. IPC requests the compliance location be described as, “an appropriate location, as defined and approved by ODEQ in the monitoring plan.” While the turbine water intake system would capture the effects of the Brownlee aerating runners, should additional aeration at Hells

Canyon Dam be necessary to meet the targets, the monitoring in the turbine water intake system would not capture those benefits.

**ODEQ Response:**

Section IV.D. requires alternative dissolved measures if the aeration systems are not achieving the required added dissolved oxygen or monitoring results collected within 3 miles downstream of Hells Canyon dam indicate dissolved oxygen levels fall below applicable minimum dissolved oxygen criteria. If additional aeration at Hells Canyon Dam is necessary, monitoring within 3 miles downstream will capture those aeration benefits.

**153. Comment from Idaho Power Company**

In addition, the ODEQ requirement of an average addition of 1.2 mg/L during July 1 through October 22 does not appear to account for information that IPC provided showing a statistically significant improvement in DO conditions of water leaving the HCC over the past 10 years. ODEQ's Draft Evaluation and Findings Report acknowledged the average DO deficit of 0.8 mg/L over the 2010 through 2017 period. Since 0.8 mg/L is the current best available estimate for the average DO deficit below Hells Canyon Dam from July 1 through October 22. IPC requests that ODEQ replaces the 1.2 mg/L requirement with a 0.8 mg/L requirement throughout Section IV-DO-DO Criteria Below Hells Canyon Dam.

**ODEQ Response:**

As noted in IPC's June 2018 application "During the cool-water life period there are statistically significant increasing trends in the 30-day mean minimum HCC outflow DO conditions (Figure 6.2-15, Table 6.2-8)." Table 6.2-8 indicates a statistically significant trend for the period of 2004-2017, and this analysis is not limited to data from 2010-2017. ODEQ finds that there is no justification for limiting the data analysis to only the last 10 years.

**154. Comment from Idaho Power Company**

(Page 16): Section V. Oxbow Bypass Destratification. Subsection C.

ODEQ is proposing to require installation and operation of the system within 6 months of approval of the operating plan. IPC requests that ODEQ provide an allowance that the implementation schedule would also be dependent on IPC's ability to obtain any necessary permits and regulatory agency approvals necessary in addition to ODEQ and FERC.

**ODEQ Response:**

ODEQ did not edit the certification to address this comment. ODEQ believes that IPC was provided sufficient time to obtain needed permits, if IPC deems such additional authorizations necessary.

**155. Comment from Idaho Power Company**

(Page 18): Section VII. Harmful Algal Blooms ("HAB"). Subsection B.

ODEQ is proposing, "IPC shall review and update the HAB monitoring plans every five years to reflect new versions of ODEQ guidance documents." IPC requests that the requirement explicitly allow for IPC to propose changes to the plan based on monitoring results in addition to new versions of ODA guidance documents.

**ODEQ Response:**

ODEQ did not edit the certification to address this comment. However, ODEQ edited the certification to require IPC to update the HAB monitoring plans at least every five years.

**156. Comment from Idaho Power Company**

In addition, ODEQ is proposing, “IPC shall submit to ODEQ proposed HAB alternative measures and a HAB alternative measures plan to address compliance with applicable criteria.” IPC requests ODEQ acknowledge HABs are a watershed issue, and an alternative measures plan should be developed in concert with ODEQ, IDEQ, and other stakeholders. For example, if noncompliant water quality conditions are flowing into Brownlee Reservoir from the watershed, and contributing to HABS within the reservoir, IPC should only have to propose and implement measures to address its responsibility to increasing HABs.

**ODEQ Response:**

ODEQ did strike the language “to address compliance with applicable criteria,” but ODEQ disagrees that an alternative measures plan must be developed in concert with ODEQ, IDEQ, and other stakeholders. IPC is required to address Project effects on HABs, and it must do so in an alternative measures plan, if requested by ODEQ. What it proposes and whom it discusses its proposal with may be determined by IPC. Such a plan must demonstrate compliance with applicable water quality standards, including toxics standard.

**157. Comment from Idaho Power Company**

(Page 20): Section IX Biological Criteria; Statewide Narrative Criteria; Protection of Designated Beneficial Uses; Antidegradation; Compliance with Other Appropriate Requirements of State Law. Subsection B. 3.

IPC requests that ODEQ modify the timing required for macroinvertebrate reporting from, “the end of each calendar year” to “within 120 days of the following calendar year”. The identification and taxonomy of the macroinvertebrate and the periphyton samples are expected to be done by an independent laboratory. Delaying the compliance reporting date by 3 months would allow necessary time for taxonomic analyses and reporting by the laboratory conducting the taxonomic analyses.

**ODEQ Response:**

ODEQ edited the certification to state “within 120 days of December 31 of each calendar year.” Since the monitoring will likely take place in the summer, ODEQ finds this provides sufficient time for laboratory reporting.

**158. Comment from Idaho Power Company**

(Page 20): Section IX Biological Criteria; Statewide Narrative Criteria; Protection of Designated Beneficial Uses; Antidegradation; Compliance with Other Appropriate Requirements of State Law. Subsection B. 5.

This subsection B.5 requires IPC to develop an alternative measures plan. It should acknowledge that implementation of such a plan may require FERC approval and that IPC will not be obligated to perform measures in conflict with FERC directives.

**ODEQ Response:**

ODEQ did not edit the certification based on this comment. A condition stating that a specified action requires approval by ODEQ does not and should not be construed as limiting what other authorizations IPC may also deem necessary.

**159. *Comment from Idaho Power Company***

(Page 22): Section X. General Conditions. Subsection A.1.

In (c) of this subsection, the draft certification provides that in response to documents submitted by IPC, DEQ may, “modify the document and approve the document.” IPC recommends deletion of subsection (c). Subsections (a) and (b) provide a means for DEQ to communicate approval or deficiencies in an IPC submittal. Since the submittal is an IPC work product that reflects IPC thinking and judgment, rather than DEQ itself modifying IPC documents, it should return the submittal to IPC to cure deficiencies.

**ODEQ Response:**

ODEQ did not edit the certification based on this comment. ODEQ’s certification that it has a reasonable assurance that proposed activities will be conducted in a manner that will not violate applicable standards is based, in part, upon its ability to ensure adaptive management, if deemed necessary, is sufficient to prevent violations of water quality standards. IPC should ensure its submittals are sufficient to meet applicable standards to avoid the need for any such modifications to occur.

**160. *Comment from Idaho Power Company***

(Page 22): Section X. General Conditions. Subsection A.3.

This subsection provides that, “IPC’s failure to develop an ODEQ-approved document within such time frame will be considered a violation of this condition of the certification.” IPC has no control over how long it would take DEQ to review the documents, and reasonable disagreement over documents and report language should not be a basis for DEQ to consider these to be a violation of the 401. This is contrary to the dispute resolution process, in section X. Subsection K.

**ODEQ Response:**

ODEQ did not edit the certification based on this comment. ODEQ notes that parties are held to a standard of good faith and fair dealing, which is relevant when interpreting such provisions to determine compliance. ODEQ’s certification that it has a reasonable assurance that proposed activities will be conducted in a manner that will not violate applicable standards is based, in part, upon its ability to ensure data and information, monitoring reports, or alternative measures plans, if deemed necessary, are provided in a timely manner to prevent violations of water quality standards.

**161. *Comment from Idaho Power Company***

(Page 22): Section X. Subsection A.4.

IPC requests ODEQ edit this paragraph to read, “Once documents are approved by ODEQ, IPC shall submit these documents to FERC with a request that such documents be incorporated and enforceable as a part of this license. IPC shall implement this certification in accordance with its terms and conditions.

**ODEQ Response:**

ODEQ did not edit the certification based on this comment.

**162. *Comment from Idaho Power Company***

(Page 22): Section X. General Conditions. Subsection B.

IPC requests ODEQ delete, “to the DEQ’s satisfaction” in line 7 of the paragraph. Whether the circumstances are beyond IPC’s control should be measured by an objective, reasonable standard, not the subjective feeling of a future DEQ employee. In addition, the sole discretion of DEQ language seems to conflict with the option of dispute resolution in Section X. Subsection K.

**ODEQ Response:**

ODEQ did not edit the certification based on this comment. ODEQ notes that parties are held to a standard of good faith and fair dealing, which is relevant when interpreting such provisions to determine compliance.

**163. *Comment from Idaho Power Company***

(Page 22): Section X. General Conditions. Subsection C.

Modification of 401 certifications are authorized under CWA § 401(a)(3) and not otherwise. A license amendment can also trigger a new 401 certification. Modifications authorized under state law as set forth in C. 3 are not permitted unless consistent with 401(a)(3).

**ODEQ Response:**

ODEQ did not edit the certification based on this comment. ODEQ disagrees with the assertion made by IPC. The applicable law speaks for itself, including but not limited to OAR 340-048-0050.

**164. *Comment from Idaho Power Company***

(Page 22): Section X. General Conditions. Subsection D.

Subsection D provides that IPC shall seek DEQ approval before undertaking any project changes to HCC facilities or operations. It is unclear to IPC whether ODEQ’s intent is that this apply only when an action, “may potentially affect water quality.” If the intent is for any changes to the Project, regardless of impact to water quality, to require review and approval by ODEQ, IPC believes that is beyond the regulatory purview of ODEQ and therefore is an inappropriate water quality certification. It is appropriate to notify DEQ of changes that may impact water quality so that DEQ has the authority to review any project modifications under the authority of CWA 401(a)(3), but DEQ does not have a veto power over all project modifications, as this provision seems to suggest.

**ODEQ Response:**

ODEQ did not edit the certification based on this comment. ODEQ disagrees with the assertions made by IPC. The applicable law speaks for itself, including but not limited to OAR 340-048-0050.

**165. *Comment from Idaho Power Company***

(Page 22): Section X. General Conditions. Subsection E.

Subsection E provides that IPC shall seek DEQ approval before undertaking any project repair or maintenance, “that may potentially affect water quality.” This subsection should acknowledge that changes may be at the direction of FERC, and in all cases, must be approved by FERC, and that DEQ will not impose restrictions on performing repairs or maintenance that conflict with FERC directives.

**ODEQ Response:**

ODEQ did not edit the certification based on this comment. ODEQ disagrees with the assertion made by IPC. The applicable law speaks for itself, including but not limited to OAR 340-048-0050. A condition stating that a specified action requires approval by ODEQ does not and should not be construed as limiting what other authorizations IPC may also deem necessary.

**166. *Comment from Idaho Power Company***

(Page 22): Section X. General Conditions. Subsection H.

The blanket prohibition in subsection H is inconsistent with the 401, the SR-HC TMDL, and the CWA. All recognize that the HCC may pass through, or “discharge” water that may not meet water quality standards in certain circumstances, such as temperatures in the summer that exceed standards because of inflow temperatures. This “catch-all” language poses the potential for misuse by third parties to assert 401 violations where none exist. The term, “Notwithstanding” should be replaced with, “Except as authorized by.” The term, “or the SR-HC TMDL” should be added after the word “Certification” in the second line.

**ODEQ Response:**

ODEQ did not edit the certification to address this comment. ODEQ disagrees with the assertions made in this comment and that such clarifications are necessary or consistent with ODEQ's statutory obligations or applicable federal law. Recently, a federal district court decision interpreted this general condition, which is in other ODEQ 401 water quality certifications, stating: "the general text in Condition S cannot serve to override the more specific and detailed provisions [of the water quality certification at issue, including its associated water quality management and monitoring plan]. The Court must read the Certification as a whole, and cannot read one Condition in a manner that would contradict or fail to give effect to various other conditions in a certification. In context, the Court interprets Condition S as a type of 'savings clause,' not meant to override more specific, carefully planned provisions, but rather to provide for unexpected eventualities, such [as] new activities conducted at the Project or the emission of a new pollutant." See *Deschutes River All. v. PGE*, 331 F. Supp. 3d 1187, 1201 (D. Or. 2018) (internal citations omitted). ODEQ interprets this provision in that manner, and notes that such an interpretation is consistent with applicable law, which speaks for itself.

**167. *Comment from Idaho Power Company***

(Page 23): Section X. General Conditions. Subsection K.4.

K.4 provides that if the dispute resolution process does not result in settlement of the issue in dispute, then the DEQs shall give notice of their decision and, “IPC shall take actions required by the DEQs in this notice.” This section should make clear that IPC reserves the right to seek review of such DEQ requirements in any applicable forum.

**ODEQ Response:**

ODEQ did not edit the certification based on this comment.



168. *Comment from Idaho Power Company*

Exhibit A—Proposed Operations

IPC requests ODEQ modify the reservoir target elevation identified for August 7 as, “2,059 or less” rather than just “2,059”. The intent of drafting to an elevation of 2059 or less by August 7 is to fulfill IPC’s commitment to releasing up to 237,000 acre-feet of Brownlee storage for out-migrating salmon flow augmentation, per the intent of the 2004 interim settlement agreement. Once IPC achieves the draft target of 2,059’ or less by August 7, IPC has fully met the intent of the 2004 interim agreement and thereafter requires the operational flexibility to continue to use storage from Brownlee Reservoir to meet summer energy demand or respond to market and system needs for energy production at Brownlee and the Hells Canyon Complex.

**ODEQ Response:**

ODEQ edited the certification to address this comment.

169. *Comment from Idaho Power Company*

A footnote is missing for August 7 target elevation of 2,059’. IPC request ODEQ add footnote c as presented in the IPC application: A component of the 2004 Interim Agreement, Exhibit 2 to this AIR, provided that, “IPC will use best efforts to hold Brownlee Reservoir at or near full elevation (approximately 2,077 msl) through June 20th; and thereafter will draft Brownlee Reservoir to elevation 2,059 (releasing up to 237 kaf) by August 7th.” Pursuant to that Agreement, this flow augmentation operation was to continue through 2005 and thereafter under certain conditions. IPC has complied with that flow augmentation operational regime annually since 2006 and expects that operational regime to be a condition of the new HCC license.

**ODEQ Response:**

ODEQ edited the certification to address this comment.

170. *Comment from Idaho Power Company*

IPC requests that the text under Project Outflows — “Maximum daily flow fluctuation” and “June 1–September 30” be displayed in one cell to make clear that the flow fluctuation limit only applies during this period.

**ODEQ Response:**

ODEQ edited the certification to address this comment.

171. *Comment from Idaho Power Company*

IPC requests ODEQ remove the reference to 13,000 cfs limit year-round at the McDuff gage. It was erroneously included in our application. The reference of 11,500 along with the footnote is the accurate value.

**ODEQ Response:**

ODEQ did not edit the certification based on this comment. ODEQ notes that on Page 19 of IPC’s June 2018 application for water quality certification, IPC provided year round flow numbers at McDuff gage that match what was evaluated by ODEQ and placed in Exhibit A.

**172. Comment from Idaho Power Company**

IPC requests that the first three sentences of footnote 9 be deleted, so the full footnote simply reads, “In 2007, the U.S. Army Corps of Engineers recommended to FERC a minimum flow for safe navigation of 11,500 cfs at the Snake River below McDuff Rapids at China Garden, Idaho, gaging station 13317660.” IPC concurs with the Corps’ recommendation and anticipates that the new license will provide for a minimum flow of 11,500 cfs measured at McDuff Rapids at China Garden, Idaho, gaging station 13317660 with a proviso that IPC would not be required to use reservoir storage to meet the 11,500 cfs minimum flow.”

**ODEQ Response:**

ODEQ did not edit the certification based on this comment. ODEQ notes that on Page 19 of IPC’s June 2018 application for water quality certification, IPC provided year round flow numbers at McDuff gage that match what was evaluated by ODEQ and placed in Exhibit A.

## 10.24 Settlement Agreement

Numerous parties provided comment on the draft Settlement Agreement including:

Burns Paiute Tribe, Oregon Farm Bureau, Malheur Watershed Council, Malheur County Farm Bureau, Malheur Soil and Water Conservation District, Oregon Association of Conservation Districts, Oregon Cattleman’s Association, Nez Perce Tribe, National Marine Fisheries Service, the Shoshone-Bannock Tribes, Idaho Water Users Association, The Shoshone-Paiute Tribes of the Duck Valley Indian Reservation, US Fish and Wildlife Service, Idaho Conservation League, Malheur Watershed Council, Upper Snake River Tribes Foundation, Oregon Farm Bureau.

Several commenters noted that the settlement agreement included only a few parties. Specifically, the settlement agreement did not include Tribes, Federal agencies, conservation groups and other stakeholders involved with fish management activities. One commenter noted the settlement agreement also fails to recognize the Tribes role as a co-manager of the affected fish and wildlife resources. Several Tribes noted that the settlement agreement can’t be implemented without tribal involvement. Both the Upper Snake River Tribes Foundation and National Marine Fisheries Service noted that the settlement agreement did not consider the Hells Canyon Complex Fisheries Resource Management Plan developed by the Upper Snake River Tribes with technical assistance from NMFS. Several commenters noted that there was no public hearing relating to the proposed Settlement Agreement.

Several commenters raised concerns over Oregon’s limitation in making any recommendation, determination or comment with respect to spring Chinook salmon or summer steelhead during the first twenty years of the new license term. Commenters raised the concern that the settlement agreement limited State participation in future discussions of the Columbia Basin Partnership Task Force. Commenters noted that the settlement agreement fails to advance ODEQ’s obligations under the Clean Water Act. One commenter noted that the settlement terms failed to address key water quality issues within the Hells Canyon Complex.

Several commenters noted that Oregon Revised Statute requires upstream and downstream fish passage around all artificial obstructions for migrating fish. The commenters noted that IPC and Oregon cannot enter into a settlement agreement that alters the requirement for fish passage. One commenter noted that it is necessary to include specific reservation of authority or reopener language in the draft certification to allow ODEQ to add fish passage conditions to certification.

Several commenters noted that they did not support fish placement above Hells Canyon dam. Commenters raised concerns that the placement of anadromous fish above any of the dams would increase the regulatory burden on farmers and ranchers. A few commenters questioned ODEQ's authority to require fish placement under the Clean Water Act.

A few commenters noted concerns with the funding mechanism in the settlement agreement. These commenters were concerned with using only Soil and Water Conservation Districts to distribute funds provided by the settlement agreement. Commenters recommended that other groups be allowed to access the funds. Commenters noted that the settlement agreement appeared to mandate changes in agricultural practices and bind farmers who are not parties to the agreement. The commenters requested that language be added to the settlement agreement to clarify that the Oregon Water Quality Improvement Program is voluntary. One commenter noted that Oregon Department of Agriculture must be engaged in the Oregon Water Quality Improvement Program described in the settlement agreement. One commenter noted that the NRCS was not the only entity with technical expertise to assist with implementation of the OWQIP.

**ODEQ Response:**

The Settlement Agreement is a contract between the identified parties only, and the terms of the agreement speaks for themselves. The Agreement does not prohibit a party to the Settlement from taking any action, including in any Oregon tributary, as long as that action is consistent with that party's commitments in the Agreement. Non-parties are not bound by the Settlement Agreement. Thus, that agreement does not preclude any non-parties from taking any action in any Oregon tributary either.

## 10.25 Application for Water Quality Certification

*173. Comment from Columbia River Intertribal Fish Commission:*

Columbia River Intertribal Fish Commission provided numerous comments on Idaho Power Company's June 2018 Clean Water Act Section 401 application for water quality certification. This document was available during the public comment period as a related document. ODEQ acknowledges the comments.

## 10.26 Evaluation and Findings Report

*174. Comment from U.S. Fish and Wildlife Service*

Please make the following changes to the Oregon Evaluation and Findings Report, p. 18, for threatened or endangered species:

The Bliss Rapids snail (*Taylorconcha serpenticola*) occurs in the Snake River. While this species does not occur in the action area addressed in the draft certifications, it does occur in spring water supplying an HCC mitigation hatchery above CJ Strike Dam, and so it is included in the overall ESA consultation for the HCC.

The Snake River physa (*Physa (Haitia) natricina*) was listed as endangered effective January 13, 1993, with a recovery plan published in 1995. At the time of listing, the species was thought to occur in two populations in the Snake River upstream of C.J. Strike Reservoir. A 2009 review of invertebrate material collected in the Snake River by IPC, confirmed with genetic analysis, shows the species occurs in IPC's Snake River Stewardship Program action area, which extends from C.J. Strike Dam downstream to Brownlee Reservoir.

**ODEQ Response:**

ODEQ edited the Evaluation and Findings Report to address this comment.

**175. Comment from Idaho Power Company**

Page 10: Section, Project Information and Summary of Project; Subsection, Brownlee Reservoir Operations. The draft OEF references IPC's providing flow augmentation through 2017. IPC requests the OEF acknowledge that IPC has provided flow augmentation through 2018 as per the 2004 Interim Settlement Agreement.

**ODEQ Response:**

ODEQ edited the evaluation report to address this comment.

**176. Comment from Idaho Power Company**

Page 49: Section, Evaluation of Compliance with Water Quality Standards; Subsection, DEQ Evaluation: Fall Chinook Flows

The format of the Draft Evaluation and Findings Report is to present DEQ's evaluation of IPC's proposals, followed by formal findings to support issuance of the 401. However, there are instances where the evaluation segment states that, "DEQ finds" (see, e.g., the last sentence of the discussion of Fall Chinook flows on p. 49), whereas the discussion on p. 49 concerning the Entrapment Management Plan simply says IPC's proposal "will ensure" compliance. To avoid confusion or ambiguity as what constitutes formal DEQ findings, the EFR should avoid use of words like "DEQ finds" unless under the heading of "DEQ Findings." In addition, IPC suggests replacing "will ensure" with "will provide reasonable assurance that" consistent with the purpose of CWA § 401 certification.

**ODEQ Response:**

ODEQ did not edit the certification to address this comment. ODEQ disagrees with the assertions made in the comment. Section 401 provides that "[a]ny applicant for a Federal license or permit to conduct any activity \* \* \* which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate \* \* \* that any such discharge will comply with the applicable provisions of sections 1311, 1312, 1313, 1316, and 1317 of this title. 33 USC 1341(a)(1) (emphasis added). Similarly, Oregon state law provides that "[t]he department must evaluate whether the activity for which certification is sought will comply with applicable provisions of Sections 301, 302, 303, 306, and 307 of the Clean Water Act, water quality standards set forth in OAR 340, division 041, \* \* \* OAR 340-048-0042(2) (emphasis added). The applicable EPA regulation requires a state certifying agency to make its Section 401 determination quoted above by certifying that "there is a reasonable assurance that the activity . . . will be conducted in a manner which will not violate applicable water quality standards." 40 C.F.R. § 121.2(a)(3). Similarly, DEQ's finding that a project will comply with applicable standards is equivalent to a determination that there is a reasonable assurance that the proposed activities, as conditioned, will be conducted in a manner that will not violate applicable water quality standards.

# 11 Conclusions and Recommendation for Certification, as Conditioned

DEQ has evaluated IPC's proposed actions, operations, and activities set forth in the June 14, 2018 section 401 water quality certification application, as supplemented, including without limitation IPC's proposed alternative measures and obligations set forth in the Settlement Agreement, as well as the References, listed below, which support its determination of compliance, as conditioned, with applicable standards.

Based upon IPC's proposed actions, operations, and activities in its 401 Application, as supplemented, including without limitation IPC's proposed alternative measures and obligations set forth in the Settlement Agreement, and DEQ has determined that the proposed Project will comply with the applicable provisions of Sections 301, 302, 303, 306 and 307 of the Clean Water Act, OAR Chapter 340, Division 41 and other appropriate requirements of state law provided IPC implements the conditions included in the section 401 Certification.

Consistent with the preceding evaluation and findings, DEQ recommends that pursuant to section 401 of the Federal Clean Water Act and ORS 468B.040, the Director, or assigned signatory, conditionally approve the application for certification of the Hells Canyon Complex Hydroelectric Project, FERC Project No. P-1971.

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*River; Conducted March, 1973. Vancouver, WA: Pacific Northwest River Basins Commission.*



# Attachment A



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

JAN 13 1991

OFFICE OF  
WATER

Honorable Lois D. Cashell  
Secretary  
Federal Energy Regulatory Commission  
825 North Capitol Street, NE  
Washington, D.C. 20426

Dear Ms. Cashell:

I am writing on behalf of the Environmental Protection Agency's (EPA) Office of Water to help clarify issues regarding the application of Clean Water Act Section 401 state water quality certification to Federal Energy Regulatory Commission (FERC) licenses. This letter was precipitated by FERC documents addressing Section 401 certification: a letter of July 25, 1990, to James Elder, Director, Office of Water Enforcement and Permits, from Fred Springer of your staff; and portions of a June 5, 1990, Report of the Staff of the Federal Energy Regulatory Commission to the Water and Power Subcommittee of the U.S. Senate Energy and Natural Resources Committee.

The FERC report (page 4) asserts that state Section 401 certification conditions on FERC licenses related to "fish, wildlife, vegetation and recreation" are inappropriate. However, protection of water quality involves far more than just addressing water chemistry. Rather, protection of water quality includes protection of multiple elements which together make up aquatic systems including the aquatic life, wildlife, wetlands and other aquatic habitat, vegetation, and hydrology required to maintain the aquatic system. Relevant water quality issues include the toxicity and bioaccumulation of pollutants, the diversity and composition of the aquatic species, entrapment of pollutants in sediment, stormwater and nonpoint source impacts, habitat loss, and hydrologic changes. A State may need to address any one or combination of these factors in particular circumstances in order to meet the mandates of the Clean Water Act (CWA) articulated in Section 101(a) "to restore and maintain the chemical, physical, and biological integrity of the nation's waters."

State water quality standards form the backbone for formulating Section 401 decisions. EPA regulations (40 CFR Part 131) implementing Section 303(c)(2)(A) of the CWA require that States adopt water quality standards having three basic components: use designations, criteria to protect those uses, and an antidegradation policy. EPA regulations direct that, where attainable, States must designate uses to meet the CWA goal in Section 101(a)(2) of water quality which "provides for the protection and propagation of fish, shellfish, and wildlife, and provides for recreation in

and on the water." States must develop criteria designed to protect and maintain these designated water uses. States are not limited to adopting chemical-specific criteria, but are exhorted to adopt narrative and numerical criteria (40 CFR 131.11(b)). In addition, EPA's Fiscal Year 1991 Operating Guidance provides that by September 30, 1993, all States are to adopt biological criteria into their water quality standards. EPA regulations also require that States adopt antidegradation policies providing for protection of existing uses and the level of water quality necessary to maintain those uses. In the case of fill activities in wetlands, existing use requirements are met if the activity does not cause or contribute to significant degradation of the aquatic environment as defined in the guidelines developed under Section 404(b)(1) of the CWA.

In its letter, FERC expressed concern that States may be imposing conditions in hydropower licenses which go beyond EPA water quality standard requirements. As we explained above, water quality standards go well beyond chemical-specific criteria. In addition, Section 510(1) of the CWA expressly reserves the right of States to adopt or enforce "(A) any standard of limitation respecting discharges of pollutants, or (B) any requirement respecting control or abatement of pollution" that are equal to or more stringent than Federal standards or limitations. If a State imposes conditions or denies certification beyond the bounds of its authority, such conditions or denials may be challenged through the State administrative and judicial system.

The FERC letter inquires about EPA's authority to limit State Section 401 decisions. As noted earlier, States have the authority to impose more stringent environmental standards. In addition, EPA's authority under Section 401 is limited. While EPA approves State water quality standards and, if necessary, promulgates Federal water quality standards, we do not have the authority to countermand State Section 401 certification decisions. The only exception is that EPA regulations (40 CFR Section 124.55(c)) provide for EPA to disregard State certification conditions or

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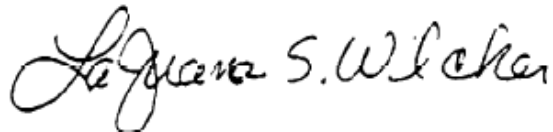
<sup>1</sup> We acknowledge some divergence in State Court decisions interpreting Section 401 certification authority. Compare In re Lava Diversion Project, 717 P. 2d 1274 (Ore. App. 1986) (allowing consideration of State land use planning in the State's 401 certification conditions) with Fourth Branch Associates v. Department of Environmental Conservation, 550 N.Y.S. 2d 769 (Albany Co., 1989) (limiting State certification decision to whether project will violate water quality standards). These decisions, however, were reached without any consideration of the views of EPA, the primary Federal agency responsible for implementation of the CWA. In any case, Section 401(d) of the CWA gives the States authority to place any conditions on water quality certification that are necessary to assure that the applicant will comply with effluent limitations, water quality standards, standards of performance, or pretreatment standards (Sections 301, 302, 303, 306, and 307 of the CWA) and with "any other appropriate requirements of State law."

certification denials when the grounds for the decision is that State law allows a less stringent permit condition. Under Section 401(a)(1), EPA has authority to conduct Section 401 certification decisions in cases where the State does not have the authority. For example, EPA issues certifications for South Dakota and for some Indian Tribes. In addition, Section 401(a) gives EPA specific responsibilities for notification and recommendations in cases where a discharge may affect the waters of any State other than the State in which the discharge originates.

EPA has issued, and will continue to issue, guidance and technical assistance for States to use in developing water quality standards and in implementing their Section 401 programs. Guidance on implementing water quality standards is included in EPA's Water Quality Standards Handbook. Recently, EPA issued program guidance on biological criteria (April 1990), and guidance on water quality standards for wetlands (July 1990). In addition, EPA is developing sediment criteria guidance and biological effects-based testing procedures for contaminated sediments, revisions to the water quality standards regulation, and other guidance as needed. In April 1989, we issued a handbook for States on the application of Section 401 certification to wetlands. Finally, as the principal agency responsible for administering the CWA, EPA routinely communicates its interpretation of statutory provisions such as those under Section 401 to State and Federal agencies.

I hope that this letter has clarified EPA's position on the broad range of elements that States need to include in their water quality standards to protect the quality of the nation's waters, the application of these and other considerations in Section 401 certification, and EPA's role in the certification process. If you have any questions regarding this letter or wish to meet to discuss water quality issues as they relate to your agency, please call me or have your staff contact Martha Prothro, Director, Office of Water Regulations and Standards (382-5400).

Sincerely yours,



LaJuana S. Wilcher  
Assistant Administrator

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<sup>i</sup> Stakeholder meeting for Hells Canyon Mercury Study, Thursday May 9, 2019, via webinar.